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ORIGINAL ARTICLES.

NOTES ON ARTIFICIAL PNEUMOTHORAX.

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Historical Considerations.

Forlanini was the first to describe artificial pneumothorax, but the pioneers were really the English. In 1822 Carson observed that the collapse of the lung was favourable towards cicatrization and healing in tuberculosis, in that it did away with and suppressed the elasticity of the pulmonary tissue. In 1834 Ramagde (London) published two cases of artificial pneumothorax. Lænnec (France) also speaks of spontaneous pneumothorax, and of the effects upon the lung after perforation. In 1881 Hérard, at the Congress of Algeria, brought forward the good effects produced by pneumothorax. In 1885 Cayley (London) performed the operation of pneumothorax in order to arrest obstinate hæmoptysis. In 1882 and following years Forlanini studied and expanded his method. Potain also made a study of the injection of air in the pleural cavity.

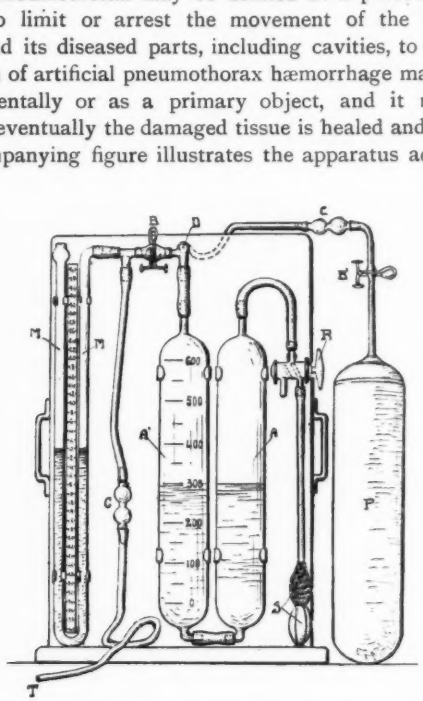
These may be called the pioneers of artificial pneumothorax. Since their times the method has been widely adopted, and there has been an enormous number of publications on the subject.[1]

[1] A serviceable bibliography is given in the Medical Research Council's "Report on Artificial Pneumothorax," prepared by Dr. L. S. T. Burrell and Dr. A. Salusbury Macnalty, and published by H.M. Stationery Office, 1922.

Methods for the Production of Artificial Pneumothorax.

Artificial pneumothorax may be defined as a procedure by which one is able to limit or arrest the movement of the lung, thereby allowing it and its diseased parts, including cavities, to collapse. By the production of artificial pneumothorax hæmorrhage may be stopped, whether incidentally or as a primary object, and it maintains the collapse until eventually the damaged tissue is healed and cicatrized.

The accompanying figure illustrates the apparatus adopted by the authors:



APPARATUS ACCORDING TO THE DESIGN OF DR. MAMIE.[1]

A and *A*[1], tubes containing the gas and solution of perchloride of mercury. *A*[1], graduated from 0 to 600 c.c. *B*, a clamp control: the communication between the tube of gas and the needle. *B*[1], a clamp control: the communication between the graduated tube and the reserve of gas *P*, which is situated behind the apparatus. *C*, a filter placed in the exit tube of the gas. *C*[1], a filter placed in the entrance tube of the gas. *M*, water thermometer graduated up to 40 c.c. *P*, reserve of gas (generally nitrogen). *R*, tap for the pressure bulb *S*. *S*, pressure bulb. *T*, tube to which is attached the needle.

In order to charge apparatus with gas, take away the forceps *B*[1], turn the tap *R* so that it communicates with the outside air, and press upon the tube *P*, which is generally a rubber bag containing nitrogen, so that the gas is forced into *A*[1], which is filled to the point 0; then shut the clamp *B*[1], and the apparatus is ready for use. Once the needle is in the pleural space, it is only necessary to remove the clamp *B*, and there is now communication between the gas-containing tube and the pleural cavity. The gas is thus forced into the pleural cavity by the pressure exerted by the tube *A*, which, of course, is full of the solution of perchloride of mercury.

[1] The Mamie apparatus is manufactured by Messrs. Hausmann and Co., of St. Gallen.

The advantages of the apparatus are many. It can be fitted in a case with a carrying handle, and is portable, being easily carried about during the physician's visits to various patients, cliniques, etc. It can be easily used by one person, and no help is necessary. Another important point is that the manometer is always in communication with the needle, even when the gas is entering into the pleural cavity; one is thus able to see exactly what is happening to the pressures during the whole time of the operation. The tubes are smaller than is usual in most types, but it is found that 600 c.c. of gas is quite enough; if more gas is necessary, there is always the reserve rubber bag *P*, which contains 4 or 5 litres. The whole apparatus is not more than 50 centimetres in height, and when packed in the light wooden case designed for it is very easily transportable.

An X-ray photograph should always be taken before the first attempt is made, in order to try to determine whereabouts success is likely to be met with—that is to say, where the visceral pleura is free, and not bound down and hampered by adhesions. This place may be either behind the axillary line or in front, as the case may be.

When inducing an artificial pneumothorax, the gas employed is usually oxygen, but after the first insufflation nitrogen or filtered air may be equally well used. The patient should be placed on his side, with the head rather lower than the thorax. A pillow should be placed beneath the chest, in such a position that the ribs are separated as far as possible, in order to make the entrance of the needle an easy matter.

The whole object of the first puncture is to create an initial cavity which can subsequently be enlarged and expanded, in order to bring about, little by little, as complete a collapse of the lung as is possible. When the manometric oscillations make it certain that the pleura has been entered (one can often feel the needle traverse the parietal pleura), 200 to 300 c.c. of gas are slowly injected. The second insufflation is done two days later; then, according to the compensatory ability of the opposite lung, refilling is continued in small quantities and at frequent and gradually lessening intervals, according to the indications present. One important point to remember is that the induction should be done more slowly on the left side than on the right, because in the former there must occur displacement of the heart to the right. The induction should also be accomplished very gradually if the other lung is not altogether sound. It is necessary to aim at producing a complete pneumothorax, or one as complete as possible, and in order to avoid temporary decompression, gas should be reinjected at regular intervals.

The period between fillings varies with each case according to the rate at which the gas is absorbed, but the control of this must be made by the manometric readings, the pressures being taken from time to

time, and by radioscopic examination. Periodical radioscopic examination is very important, as it indicates the results of the insufflations, the state of compression of the lung, the size of the pocket of gas, and the position of the heart, which in left-sided pneumothorax is, of course, displaced to the right. Radioscopic examination also gives information as to the state of the diaphragm on each side; sometimes the two diaphragms are depressed together, but in other cases the diaphragm on the pneumothorax side becomes raised, while the other one is lowered. The position and nature of adhesions can also be investigated by the screen, and it is possible to see from time to time how these stretch and even give way during the treatment; the respiratory efficiency of the other lung can also be observed.

A pneumothorax may be induced (*a*) rapidly, or (*b*) gradually. If done (*a*) rapidly, as is indicated in certain cases, the patient may become fatigued and collapsed, with shortness of breath and rapid action of the heart and palpitation. There is also in rapid compression the danger of tearing adhesions. Compression should always be done (*b*) gradually if possible—that is to say, by frequent insufflations of small quantities of gas—thus causing very slow raising of the pressures. In this case the invalid feels no fatigue, the heart is not troubled, but is displaced gradually and imperceptibly, and there is no dyspnœa; the patient gradually becomes accommodated to the altered conditions without any unpleasant symptoms, and there is no strain put upon the opposite lung.

Signs and Symptoms after the Insufflation.

The Impressions and Sensations of the Patient.—As a rule, there is no pain and no shortness of breath, but if too much air is injected at one time, the respiration is liable to become troubled, even with a negative pressure; but this is transitory. Many patients who come to the consulting room are able to walk immediately after the filling, and can return to their own homes. There is no palpitation or cardiac trouble if the fillings are done carefully and gradually. As a rule, once the lung is compressed and immobilized, patients breathe better. This improvement is not complete until the pneumothorax has become properly established.

Signs on Auscultation.—These vary according to the type of case. As a rule, the breath sounds become less and less easily heard, and finally disappear, and with a complete pneumothorax there is respiratory silence. Sometimes, however, one hears a metallic bruit, especially if the pressure is rather high. Physical signs, such as adventitious sounds, râles, etc., disappear.

The Effect on the Invalid—Fever.—If there has been fever the temperature descends, and sometimes even becomes normal after the first

insufflation ; but, as a rule, it is a slow descent, and does not reach the normal until from one to three weeks after the induction. Sometimes, however, there is considerable rise of temperature the following day ; this is due to pleural irritation, the separation of adhesions, or to a transitory intoxication, the result of the squeezing of the diseased lung. This rise of temperature usually only lasts a day or so, and then comes down. The lowering of the temperature is more marked and rapid when the pneumothorax is a complete one, and in these cases it remains down the whole time, and is not generally affected by the fillings. In a partial pneumothorax, however, where a part of the lung is adherent and not completely compressed, the lowering of the temperature is less rapid and complete, and in these cases very frequently immediately after each "blowing up" there is a rise of temperature lasting for a day or two, due to the products of the disease process in the non-compressed part of the lung being squeezed out, with resulting toxæmia.

Expectoration.—During the induction of the pneumothorax, after each of the first few insufflations the expectoration is increased ; this is due to the compression of the lung, which is thereby emptied of expectoration. The invalid is liable to cough and spit considerably immediately the needle is withdrawn, and even during the operation itself. However, the following day this temporary increase of sputum ceases, and is followed by a distinct diminution. When the process is complete there is no sputum. Occasionally the complete suppression of sputum is very rapid, and the writers have seen cases in which the cough and expectoration were completely abolished three or four weeks from the commencement of the treatment. Frequently, however, there still remains a certain amount of sputum, which is generally purulent for the first three to six months after the commencement of the treatment, but which then becomes more and more mucous and white, the tubercle bacilli diminishing and finally disappearing.

Hæmoptyses.—Hæmoptyses are arrested by a pneumothorax, even very severe ones. The writers remember a case of a lady who was our patient in a clinique. We were passing the door of her room one day when she suddenly had an enormous hæmorrhage. It happened that we were just going to do a filling on another patient, and were carrying the pneumothorax apparatus all ready for use. We entered the room immediately, and found the invalid almost dead, half recumbent on the bed, and hardly breathing. What was to be done? A minute or two more and the lady would certainly have been dead ; the blood was flowing from her mouth in a continuous stream, and she was literally being drowned by her own blood. A pneumothorax of urgency was tried at once, and as the lung was compressed, the blood was squeezed out from the bronchii and pulmonary tissue, and flowed out

from the mouth in large quantities; but after a while respirations returned, the condition improved, and the bleeding ceased. Eight hundred c.c. of gas were injected. It is true that this patient subsequently died, but the writers cite this instance as a striking example of how even an enormous hæmorrhage, such as this was, can be stopped by pneumothorax.

General State.—In favourable cases this is very striking; the weight increases, the appetite improves, the general state and health revive, night-sweats stop, and the aspect of the invalid changes completely. Sometimes this change happens quickly, but in other cases it is very much slower. Not infrequently one sees a change so striking that it really appears to be a veritable resurrection. The patient is no longer intoxicated and poisoned by the products of the tubercle and other bacilli, and is soon able to lead a more or less normal life. It is not too much to say that a pneumothorax is capable of arresting a process of an acute and severe form of tuberculosis, which cannot be arrested in any other way.

The Complications of Artificial Pneumothorax.

(*a*) *Subcutaneous Emphysema.*—In cases where there is a very high pressure, the gas occasionally filters into the tissues and travels beneath the skin, producing the well-known crackle of subcutaneous emphysema, and perhaps also giving rise to a little pain and discomfort. This, however, is of no account, and passes away in a day or two.

(*b*) *Pain in the Chest.*—This is due generally to the stretching and rupture of adhesions. It is not serious, and disappears fairly quickly.

(*c*) *Simple Effusions into the Pleura.*—Simple effusions into the pleura, without fever or pain, occur in at least 50 per cent. of cases; they are frequently only recognized on X-ray examination, and give rise to no disquieting signs or symptoms.

(*d*) *Serous Pleurisy.*—This commences with pain, fever up to perhaps 102° or 103°, a large and usually sudden effusion, and dyspnœa. The effusion can take place suddenly at the commencement of the pleurisy, or even after several weeks. It generally absorbs, and should not be aspirated if it can possibly be left. Sometimes the effusion is completely absorbed, but reappears a second time three or four months later. If an effusion is very large and does not tend to disappear, absorption can often be aided by causing the patient to sweat; this is greatly preferable to puncture and aspiration. The patient is sweated for one hour three times a week with the aid of aspirin, blankets, hot bottles, etc. As the fluid is absorbed or taken away it should be replaced by air, in order to prevent, if possible, the decompression of the lung and the formation of pleural adhesions,

which would make the further treatment of pneumothorax an impossibility. In these cases the patient should be observed and controlled frequently by X-ray examination.

(*e*) *Purulent Effusion.*—In these cases there are three possibilities: (1) Purulent effusion with Koch's bacilli only. This is often seen in cases where there are powerful adhesions, or in caseous and softening forms of tubercle. It is better not to aspirate too soon. The effect of this form of effusion is often favourable, and helps compression of the lung. There is no fever, and the condition is really that of a cold abscess. (2) Purulent effusion with tubercle bacilli and the organisms of mixed secondary infection. This will give the same symptoms as (1), and in consequence the treatment is the same—at any rate, at the commencement; later on, if puncture and aspiration are indicated, injections of the oil of gomenol sometimes give very good results. In this type of case the mixed secondary infection is of a mild type, and does not give the symptoms of septic poisoning. (3) This is an altogether different form, being quite a septic infection of the pleural cavity, and is really acute empyema and pyopneumothorax. In these cases there are all the symptoms of septic poisoning, with high fever of a septic type, sweats, attacks of shivering, and very rapid wasting. One can try at first aspiration and washing out of the pleural cavity with antiseptics; if this is of no avail, then resection of the ribs and free drainage combined with washing out must be tried, and this would probably have to be followed later by a thoracoplasty operation, in order to attempt the obliteration of the cavity. These cases are extremely grave from the commencement, and often fatal. We have seen a few cures.

(*f*) *Perforation of the Lung.*—This accident occurs in those types of disease in which there has been extensive softening and severe infection. A fistula is formed into the pleural cavity, which, of course, rapidly becomes infected. The symptoms are those of great pain, dyspnœa, and rapid rise of the intrapleural pressure, which must be relieved. This is usually a fatal complication.

(*g*) *Gas Embolism.*—This occurs when gas enters into a large vessel. An epileptic form of seizure or hemiplegia may occur, and sometimes the patient dies quite suddenly without having time even to utter a cry. With proper precautions this complication is not met with.

(*h*) *Pleural Reflex.*—Occasionally, as the needle enters the pleura, there are produced all the symptoms of collapse, with pallor, stoppage of the pulse, or even convulsions. The treatment, of course, is that of a syncopal attack.

(*i*) *Complications on the Other Side.*—Pleurisies and pneumonias may occur. During the influenza epidemic we saw cases of pneumonia of the opposite lung in invalids with pneumothorax, causing extremely

severe symptoms of dyspnœa, which have been greatly alleviated by taking out 200 to 300 c.c. of gas from the pneumothorax. The invalids in these cases have sometimes even recovered. Dry pleurisies are frequently seen on the opposite side. However, if this lung is fairly healthy, there is in general nothing to fear in this; the pain and condition is transitory; but during these attacks one must suppress for the time being the insufflations. If the opposite lung is affected to a slight degree with tuberculosis, as well as the one in which the pneumothorax has been done, this condition generally improves and becomes cured during the course of the pneumothorax; but in these cases it is important to give as small fillings as possible to the bad lung. A big filling with high pressures always throws a strain on the opposite lung, and in cases where this lung is already affected to a slight degree damage may be done, and congestion and a return to active symptoms produced.

(*k*) *Return of the Fever during the Course of Treatment.*—This can be produced by pleurisy, some process going on in the opposite lung, or by allowing too long an interval between the fillings, thereby permitting the diseased lung to expand and the symptoms of active disease to return. There may also be fever produced immediately after a filling, but this is of a transitory nature only. We have recently seen fever occur from another cause during the course of pneumothorax—that is to say, an intestinal tuberculosis supervened, which caused the death of the patient; the pneumothorax itself was a brilliant success, there was no cough, sputum, nor fever; but the invalid became cachectic, developed all the symptoms of intestinal tubercle, and eventually died from this cause.

(*l*) *Cardiac Complications.*—Sometimes one sees tachycardia after an insufflation, but, as a rule, it passes off and is not of great importance. However, with a careful and prudent technique, cardiac complications are not usually seen.

Selection of Cases, Indications, and Contra-indications.

At first there was a tendency to exaggerate the results of pneumothorax, and there was even a school who advocated employing it for practically every case, even the slightest. This line of thought is, in the opinion of the authors, quite unjustifiable, and it is necessary, before doing a pneumothorax, carefully to consider in each case the pros and cons, and only to come to a conclusion after serious thought and reflection.

Indications.—(*a*) It is a necessary procedure, when possible, in febrile cases which are not reacting to ordinary treatment. As a general rule one may say that if after three months' serious treatment there are still symptoms of activity and the fever has not ceased, then

it is quite useless to wait longer; but one must make a mental picture of the evolution of the disease and the spreading of the lesions rather than their present extent or their form, whether caseous, pneumonic, galloping, cavernous, etc. The ideal case is that of disease in a single lung, and there are certain medical men who require this before commencing upon a pneumothorax treatment. It our opinion, however, this is not altogether necessary. Leon Bernard has proved that it is possible to live with a sixth part of the total pulmonary capacity. Furthermore, it is very rare that one finds in severe cases—which are, perhaps, the most usual for which one is called upon to perform a pneumothorax—one diseased lung and the other perfectly healthy. There is usually some amount of disease in the better lung. If the disease in the better lung is not of too great an extent, and does not appear to be in a condition of active evolution, then one can quite rightly enter upon the treatment; and one must remember that in any case of tuberculosis, if the main lesion is dealt with and rendered innocuous, then smaller lesions in other parts show a tendency to cure themselves. One can even perform a symptomatic pneumothorax—that is to say, even in bad cases where there is little hope of ultimate cure, one can, by suppressing activity in the more diseased lung, give great alleviation to the patient in some cases, cause the fever to diminish, the sputum to become less, and the general state to improve temporarily at any rate. In this way a more comfortable and less painful existence can certainly sometimes be secured for an invalid. It is even possible, and has been performed in certain bilateral cases, to do a partial pneumothorax on each lung alternately, thus giving each diseased lung a periodical rest; this, of course, is not a curative measure, but it is certainly a palliative one, and in this way it is possible to make the last days of the patient more bearable and comfortable. (*b*) In cases where there is grave and severe hæmoptysis, even though the actual extent of the lesion itself be slight, a pneumothorax is often to be strongly recommended for two reasons: first, to arrest the hæmoptysis, and, secondly, to circumvent the common complication of a large hæmorrhage—that is to say, aspiration pneumonia, which is a very serious complication, and may easily have a fatal result. (*c*) Pneumothorax may also be very advantageously attempted in old chronic forms where there are large cavities and much expectoration, even if the case appears to be quiescent and without fever. The danger of reinfection in these cases is great, and there is also the chance of a large and fatal hæmorrhage at any time from an unprotected and weakened vessel in a cavity. One may by this means suppress the expectoration, which is always a distressing and unfavourable feature of these cases, and makes life very miserable for them. Often, of course, it is impossible to do a pneumothorax on such a type of

case, because of the presence of strong adhesions, which render the procedure impossible.

Contra-indications.—(*a*) Bilateral lesions where there is activity on both sides. Even here occasionally life may be prolonged by doing a double pneumothorax, or doing the two lungs alternately, thus giving each side a temporary rest. Forlanini and Bernard have published cases of this kind, and the writers of this article have personal knowledge of one case in which life was certainly considerably prolonged by this procedure. (*b*) In cases where there are considerable pleural adhesions a pneumothorax is, of course, rendered impossible. There may, however, be sufficient freedom in part of the lung to effect a partial collapse, and even this may have extremely beneficial effects. If the adhesions are not very strong, it may even be possible in the course of months to gradually stretch them and break them down, and thus obtain a more complete collapse. (*c*) Artificial pneumothorax is contra-indicated where there is advanced tuberculosis of other organs, such as tuberculosis of the larynx, intestines, kidneys, or where there is amyloid disease. (*d*) It is also contra-indicated in cases where the patient is obviously too far gone to hope for any response—for instance, where there is much emaciation, cachexia, etc., the resistance of the body being worn down by disease. (*e*) In cases where there is valvular disease of the heart, and in which compensation is not very good, a pneumothorax should not be done. (*f*) It is also contra-indicated where there is an associated disease of a grave nature, not necessarily tuberculous.

Results of Pneumothorax.

The immediate results have already been spoken of; we will talk now of more remote results. If one visualizes the statistics of different authors, one notices that there are in all a good many remote results which are bad or not at all of such a flattering nature as the immediate results would lead one to hope for. However, it must always be remembered that a large number of these bad cases have certainly been relieved of their most troublesome symptoms, have had life made more comfortable for them, and have survived longer than they otherwise would have done.

All doctors who have any experience of pneumothorax have had very good results, mediocre results, and bad results; they have also had cases which may be termed complete cures—at any rate, as regards the activity of the disease—and cures which have been maintained for several years, even after the pneumothorax has been discontinued. Some writers have cited as many as 30 to 40 per cent. of good cases, and when it is remembered that practically all these cases have been really bad ones, generally proceeding rapidly downhill and towards death, it is certainly a great satisfaction to know that there is a method

which has proved itself of value, and which enables the active spread and evolution of disease to be arrested, and which, at any rate, can give some comfort and prolongation of life to the dying.

It is quite true that the method should be further improved, that the indications and contra-indications should be laid down more precisely, and that the duration of the treatment should be better worked out and known than it is at present. There is much yet to be done, and surely with improved methods, greater knowledge, and a more precise technique, one will be able to arrive at a still higher percentage of good results.

Artificial Pneumothorax at High Altitudes.

The writers of this paper are both agreed that, if possible, it is better not to commence the induction of the pneumothorax treatment at an altitude. They have had much experience in this, and have observed that not infrequently the commencement of the treatment at a height of, say, 5,000 feet does not give such a good result as when it is done in the plains.

It must be remembered that cases selected for treatment are generally bad ones, with much activity, toxæmia, feeble heart muscle, and poor resistance; they are, moreover, usually going downhill. It is probable that the first fillings of a pneumothorax at a height of 5,000 feet—the demands of which altitude are already considerable—throw too great a strain upon their resistance, and upon the heart and the other lung. It is not, of course, always possible to send a patient to a low station, and one must perforce commence the treatment in the mountains if the patient is not well enough to travel; but where possible the writers, at any rate, always make a practice of sending their cases down to the plains for the induction.

When the pneumothorax is established, and the patient has become used to the new conditions, and when the general health and resistance are improved and the toxæmia has disappeared, then the patient returns to the mountains to continue the treatment. For the after-treatment of pneumothorax a mountain climate has proved itself, in our experience, to be eminently suitable and very beneficial. The cases almost invariably do really well.

Another important point which must be remembered when sending a pneumothorax case from the sea-level to a mountain climate is that the gas, of course, expands as the patient ascends. Therefore, before sending such a case, it is important to make sure that he has as low a pressure as possible to start with. We once saw a patient arrive who had been given a good tight filling before travelling; the gas had expanded, and not only was the diseased lung collapsed, but the compression was so great that the opposite lung was also partially com-

pressed. This patient was in a state of acute dyspnœa, and had to be decompressed at once.

It is well also, when pneumothorax patients travel from the plains to the Alps, to advise them to take a few days on the journey, and to spend a little time at some intermediate mountain station, so as to get them more gradually accustomed to the effect of the ascent. A too sudden journey from the plains to a height of 5,000 feet might throw too great a strain on them, and do them harm. Similarly, when a patient leaves the mountains and returns to a lower level, he should always be given a rather tighter filling than usual before leaving, because as he descends the gas naturally contracts.

The following data have been kindly supplied by W. A. Nayler, Esq., M.A.:

Two thousand c.c. of air at sea-level increase roughly by 80 c.c. for every thousand feet, becoming 2,240 at 3,000 feet, and 2,400 at 5,000 feet.

Conversely, 2,000 c.c. at 5,000 feet decrease by 50 c.c. for every thousand feet, becoming 1,850 at 3,000 feet, and 1,650 at sea-level. In the case of a cavity of limited expansibility, the pressure rises and falls *pari passu* with the barometric pressure.

SOME IMPRESSIONS OF TUBERCULOSIS PROBLEMS IN INDIA.

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M.D.,

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I have recently had the privilege of visiting India for the third time in order to study the problems of tuberculosis in that country. My last extensive tour from Bombay to Burma one way and from Nepal to Nilgiris in another has convinced me that tuberculosis is increasing in many parts of India, especially in presidency capitals, great industrial and commercial centres, and the large towns, and it appears also to be extending to rural areas. From careful calculation the writer found that the annual mortality from tuberculosis in India could not be less than one million, that one death in every ten of the total mortality is due to tuberculosis, and that in many Indian cities out of three deaths recorded among adults one dies of consumption. That such a state of affairs should exist in India in this enlightened twentieth century is truly appalling.

Causal Factors.

I was struck with three important causes: Insanitation, poor or mal-nutrition, and overcrowding. The sanitary standard as regards conservancy, drainage, disposal of sewage, clean water supply, good housing is very low in many parts of India. The housing conditions of even well-to-do classes come short of modern artisan dwellings in England as regards sanitation and ventilation. There is widespread poverty among the masses. The wages among them have not risen in proportion to high rents and dear living, and millions live in a state of chronic want and starvation. The margin of their staying power is so small that they succumb literally in thousands to any disease that may prevail. Overcrowding in principal towns and cities like Bombay is so great, and the house rent is so high, that even some of the middle classes and humbler Anglo-Indians are glad to live in cheap lodgings and tenement blocks. So dense is the population in some places that in certain parts of Lahore 465 persons are crowded in an acre, in Cawnpore 563, in Bombay 638, whilst in the worst parts of a city like Leeds it is only 104 and in Birmingham 101. Under the joint-family system the growing families under the same roof find their accommodation more and more limited and sanitary arrangements more hopeless. Especially the inner part of the houses where purdah women reside is deficient in light, fresh air, and sanitary conveniences. No wonder that in many cities more than twice as many women die of consumption as men, and that the more the purdah system is enforced, the greater the tuberculosis mortality, as among Mohammedan women; and the less it is observed, the less the mortality, as among the Burmese women.

The use of cow's milk does not form an important factor in the prevalence of tuberculosis in India, owing to the fact that bovine tuberculosis is very rare in that country, that children are mostly breast-fed, condensed milk is extensively substituted for fresh milk, and where fresh milk is consumed it is invariably boiled before use.

Besides the predisposing causes that operate in common with other civilized countries, such as poverty, overcrowding, slums, underfeeding, excess, mental strain, etc., the Indian climate, malaria, and the social habits and customs of the Indian people have considerably helped to favour the spread of tuberculosis. Heat intensifies the progress of the disease. Dust and insanitation help bacterial growth and virulence, and are the two great enemies of India. When to these is added poor food or ill-balanced diet, we have a threefold factor which profoundly helps the spread of tuberculosis in India. Malaria adds fuel to the disease, and is often mistaken for it. We have already alluded to the greatest prevalence of consumption amongst the women in the zenanas, many of which admit very little air and sunlight. Child-marriage is a

fertile cause of many a young and immature mother falling victim to consumption from the strain of pregnancy and child-birth. The indiscriminate spitting of the careless consumptive disseminates tubercle bacilli, which, if virulent and the soil favourable, helps to spread the disease.

Remedial and Preventive Measures.

In such a deplorable, insanitary, and poverty-stricken condition of the Indian people, any attempt to treat tuberculosis by drugs or tuberculin will be like administering a pill to cure an earthquake. All remedies, to be of any success, should be based on improving sanitation and increasing the standard of nutrition of the Indian people. Then comes the importance of establishing open-air sanatoria by experts as both curative and educational means in the treatment of pulmonary tuberculosis. At present there are only five or six open-air sanatoria for 319 millions of people, and therefore the need for more sanatoria is indeed very great. If the Indian physicians, philanthropists, and politicians are really in earnest to give a death-blow to the great scourge of tuberculosis they must go farther. They must adopt far-reaching social and economic measures, such as fair wages both to middle and working classes, improved housing, planting of garden cities and colonies, diverting the migration from the town into the country by making it attractive, organizing and developing industries, the teaching of elementary hygiene in schools, etc.—all of which, by improving the general well-being of the people and increasing their resisting powers, would lay a sure foundation in the eradication and prevention of tuberculosis in the near future.

THE PHYSICS OF HELIOTHERAPY.[1]

By Dr. A. ROSSELET,

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The range of radiation extends almost unbroken from the large waves of wireless telegraphy, of several miles length, to those of limited amplitude emitted by radioactive substances, the smallest size of which is 0·72 U.A. Between these extremes are those characterizing the infra-red, the luminous, the ultra-violet, and the Röntgen rays. All these radiations travel at the same rate of 300,000 kilometres a second. Of this huge scale of ether waves heliotherapy only employs a few notes,

[1] The English version of this paper, at the desire of Drs. Rollier and Rosselet, has very kindly been translated from the French by Dr. Dorothy P. Priestley, of 14, De Grey Terrace, Leeds.

since the solar spectrum is limited at the infra-red end by wave-lengths of 20 μ, and at the ultra-violet end by wave-lengths of 0·3 μ.

The spectrum gives us the wave-length and its frequency, but one too often forgets that these two factors are not enough to determine the biological action of radiation, and that another of great importance is its intensity. In a recent publication[1] we have studied at length the modifications in the length of the spectrum as well as in the intensity of the solar radiation, as influenced by the following: Altitude, height of the sun above the horizon (*i.e.*, time of day), and season. In the present paper we merely summarize the more important conclusions arrived at by our recent researches.

The Physiological Action of Direct Light.

(*a*) *In a specified locality* (plain or hill) the length of the spectrum varies (1) with the hour of the day. It is greatest when the sun is at the zenith, and smallest at sunrise and sunset; (2) with the season. In summer, in July and August, it is possible to show the length of the shortest wave in daylight. The length of the spectrum is always curtailed in the other months of the year, and is minimal in December. (i.) The intensity of the different parts of the spectrum is practically the same in summer; (ii.) the differences between the intensities become proportionately increased with the approach of winter, and the shorter the wave-length the greater the difference. The winter sunlight is poor in ultra-violet rays.

(*b*) *Difference between the Plain and the Mountain.*—The length of the spectrum is not noticeably altered. In summer the intensity of the different rays is approximately the same on the plain as in the hills. In winter the value of the intensity diminishes, but always remains greater at a high altitude than in the lowland. It is this seasonal difference in the intensity of the radiations, which is much less marked in the highlands, that forms one of the characteristics of its climate; the result is that the intensity of radiation is more equal throughout the year than in the lowlands, and heliotherapy can be employed there in winter.

Meteorological measurements thus point to the conclusion that heliotherapy, looked at solely from the point of view of intensity of radiations, is obtainable in the lowlands as well as in the hills during the summer months. If the highlands are in any way better during this time of year it is solely on account of the freshness, the dryness, and the tone of the air; in fact, the patient is not troubled there as in the lowlands with damp, warm surroundings, whose debilitating action is often inimical to the beneficial effect of direct radiation.

[1] *Revue suisse de Médecine*, Nos. 7, 9, and 11, 1922.

The Action of Diffuse Light.

Diffuse light is especially intense at the seaside, where it forms one of the main features of the sea-coast climate; the intensity of diffuse light decreases the higher one gets above sea-level. As its origin is not only dependent on molecular diffusion, but also on the diffusion due to foreign particles in the air, it will be increased by mists, and some days, in which the sun is lightly clouded, are rich in actinic radiations, of use in the sun cure.

Meteorology should be one of the foundations of heliotherapy. Medicine should insist that this science directs its treatment, by getting from it practical information. We have already done this in our summer session of 1921 at Geneva, as well as in the course at Leysin on heliotherapy.

From the start it is essential to differentiate clearly between the sun cure of winter and summer. We take it for granted that our patients have come slowly, but surely, by Dr. Rollier's well-known methods to expose their whole bodies to the sunlight.

Sun Cure in Winter.

The cure is dependent on three important factors: (*a*) The relatively short length of the solar spectrum; (*b*) the relatively feeble maximum intensity of the solar radiation; (*c*) the relatively short duration of this maximum intensity. These last two considerations allow the patients to make full use of the two hours of sun to which nature confines them. The doctor will not be bothered by their everlasting questions: "When must I start my cure? How long will it last?"

Sun Cure in Summer.

This, too, is dependent on three factors: (*a*) The maximum length of the spectrum; (*b*) the maximum intensity of the sunlight; (*c*) the prolonged duration of this maximum intensity.

It is in summer that the doctor must so often be answering the two foregoing questions, and this is not always easy, as the sun cure may go on from 6.30 a.m. to 6 p.m. Some patients, well accustomed to sunlight, are able to stand it during this length of time without bad effects on their cure; but in acting thus they do not follow the cautions of their doctor, who would not dare to expose them for more than three hours to the rays of the sun on a hot summer day.

But it is necessary to know the time of day when the sun cure will be most effective. Are we guided by theory in this important factor? Given a pure atmosphere, free from all dust, and containing very little moisture, thus rendering its heating capacity minimal, and considering only the intensity of the direct radiation, it must be recognized that the

sun cure should be undertaken between 10 a.m. and 2 p.m. Two facts drive us to this conclusion: (1) At this time of day the solar radiations have their maximum intensity which correspond with their maximum action; (2) it is at this time of day that the radiations of short wave-length occur, especially the ultra-violet rays, whose great activity has been demonstrated by MM. D. Berthelot and Gandechon.

Nevertheless, patients are not always advised to undergo their cure between 10 a.m. and 2 p.m., because the temperature of the balconies is high, sometimes unbearable, and drives them into their relatively cool rooms. For this reason the early hours of the day, from 7 a.m. to 9 a.m., are sometimes chosen, despite the weak intensity of the sunlight and its deficiency in actinic rays. This procedure is not surprising when one knows how enervating, distressing, and even weakening, is a hot-air bath. Still, it is important to find out how it is possible to use the sunlight of maximum intensity without distress. We have experimented with certain of Dr. Rollier's patients as follows:

The patient starts his cure at 9.30 or 10 a.m. This lasts from five to fifteen minutes, and is then interrupted by rest in the shade for at least twenty minutes. The exposure is repeated for five to fifteen minutes, and again followed by twenty minutes' rest. This is continued until the total time of exposure adds up to two or three hours. The number of partial exposures varies with the nature of the illness and its situation, and, above all, with the individual reaction to the sunlight, which is markedly different in different patients. If the patient is in bed, rest in the shade is got by lowering the sunblind of the balcony, If he is up, he may rest on his bed or elsewhere in his room. This interrupted cure is to some extent possible if the patient be left where he is, and covered during the rest intervals with his bedclothes to prevent direct sunlight on his whole body—thus the excessive heat is borne better. But, obviously, the method is inferior to the two former ones. Experience has shown that in this "interrupted cure" the fractioning of irradiation is a better therapeutic proposition, the intensity of the radiation supplementing the time of exposure. However, various observations, still too few to make us able to be sure of their indications, suggest that in sunlight therapy, as in X-ray therapy, a certain amount of energy must be accumulated in the body to produce the desired effect. This can be got either by the continuous or interrupted method.

This method of treatment is not the only one to which we are indebted to meteorology; there is another, upon which we insisted in our summer session at Geneva—namely, the importance of remembering that, in the treatment of certain skin lesions, only certain parts of the spectrum are of value—in particular, in cases of lupus, psoriasis, various ulcers, fistulas, etc., for the cure of which the ultra-violet rays are most beneficial. But as it is unwise to apply to similar cases long

wave radiations from artificial light, so it is illogical to expose them to early sunlight in which short waves are practically absent; at any rate, their intensity is barely appreciable, save from 9 a.m. to 3 p.m. in summer and from 11 to 1 p.m. in winter, as our own experiments have shown.[1] It is during these hours that the interrupted (otherwise unbearable) treatment of superficial lesions must be given. Among such lesions lupus has first place. It is also in these cases that one must remember the great actinic power of diffuse light, and urge patients never to cover the skin lesion for a whim, but to expose them to the open air, where the blue, violet, and ultra-violet radiations are diffused.

Solar radiation, a tiny part of radiant energy, covers the 150 million kilometres which separate the sun from the earth in eight minutes; it passes through the atmosphere, there undergoing the changes in length of spectrum and intensity which we have mentioned, and then falls on our body. It strengthens and heals it by various means, often obscure, which are beside the question here.

REST BREATHING AS A PHYSIOLOGICAL ADJUVANT IN THE TREATMENT OF PULMONARY TUBERCULOSIS.

By S. ADOLPHUS KNOPF,
M.D. (NEW YORK AND PARIS).

Since the appearance of my first article on this subject some time ago in the *American Review of Tuberculosis*, the *New York Medical Journal*, the *Canadian Journal of Medicine and Surgery*, in *Tubercle*, and in *L'Union Médicale du Canada*, some of my colleagues as well as myself have had opportunities of making more extensive trials and observations with rest breathing, and as a result I may say I have been able to improve the *modus operandi* considerably. In order that the readers of the *British Journal of Tuberculosis* may have the benefit of the latest method whereby we may help our consumptive sufferers, I am availing myself of the invitation of the editor of this journal to give a brief résumé of the theory and practice of this physiological adjuvant.

From the study of comparative physiology, I found that animals which breathe slowly usually live longer and are less susceptible to tuberculosis than those which breathe rapidly. To give only one example among our domestic animals: the cow, which does not live as long as the horse, and is very susceptible to tuberculosis, breathes fifteen to thirty times per minute—the horse breathes only eight to ten

[1] A. Rosselet, *Bull. Soc. Vand. sc. Nat.*, 1922.

times per minute, and, as is well known, is almost refractory to this disease.

The wonderful success which may be obtained in certain selected cases of tuberculosis by means of artificial pneumothorax has prompted some enthusiasts to recommend it for all kinds of cases. If this were possible it might, indeed, be the ideal treatment. That it cannot be done when the pleuritic adhesions prevent the entrance of air into the intrapleural space is well known, and the fact that it is a complicated treatment and at times followed by unpleasant sequelæ makes artificial pneumothorax unsuitable as a universal treatment in pulmonary tuberculosis.

I believe that in controlled and diaphragmatic respiration, aided, if necessary, by slight mechanical restrictions, we have the best substitute for artificial pneumothorax, particularly when the tuberculous lesion is limited to the upper portion of the lungs, as it is in the majority of cases. As my space for the exposition of this subject is limited, I will state only the essentials which will enable my readers to demonstrate the value of the treatment for themselves. With the exception of the few cases that present contra-indications, which will be enumerated later on, the treatment is applicable in all stages of the disease, except, of course, the terminal stage. That the results will be best in the early cases must be evident; that the results must be better when the general rest treatment in the open air and the proper hygienic, dietetic, and symptomatic treatment are carried out at the same time, than if the diminution of the respiratory movement is the sole remedy resorted to, is also obvious.

The intelligent co-operation of the patient can only be obtained by explaining to him at length the object and aim of the procedure. He should be told that it may take some time before he can perceive any improvement, but that the method can in nowise be injurious to him, and that if he feels the slightest discomfort he should merely stop it. He must be furthermore assured that it cannot bring on a hæmorrhage, although a hæmoptysis may occur, as it does in all sorts of treatment, but that it is more likely to prevent one. When one occurs, the quiet and diminished respiratory movements will rather help in the coagulation of the blood and in the arrest of hæmorrhage, because it diminishes the movements of the bleeding lung.

Here is my *modus operandi:* At the beginning of the treatment, the patient lies on his reclining chair, or preferably in bed, with his head slightly elevated. Later on he may be able to resort to this method of breathing in a half-reclined or sitting position. The patient should be told to imagine that the respiratory movement begins in the toes of his right foot, the inhalation gradually travelling upward as far as the diaphragm on the right side, then over to the left side, and then

gradually descends during expiration downward to the left. While, of course, this breathing from the toes upward is merely imaginary, it results in a diaphragmatic breathing, and whatever quantity of air is inhaled passes mainly through the lower portions of the lungs, while the upper portions, where tuberculous lesions are usually located, are put almost completely at rest.

In order to be able to teach the rest breathing intelligently, I would advise the physician to practise it first himself and to be sure that the patient understands exactly how to master the technique, it is well to teach it in the following manner: The patient being placed in a sitting or half-reclining position, with his feet extended and slightly separated, should be told to inhale as slowly as the physician's hand with index finger pointing moves in the upward direction, beginning at the toes of the right foot, crossing the abdomen to the left, stopping there a few seconds, then to exhale while the hand moves downward to the left foot, and rest a few seconds before the next inhalation. Repeat this procedure a few times until the patient fully grasps what he is asked to do and does it correctly. While indicating the direction and duration of the inhalation with one hand, the physician may place the other over the upper portions of the patient's lungs and thus observe whether they are at complete or at least at relative rest. Later on, by placing his own hands on his chest, the patient may learn to know whether or not he is doing the diaphragmatic breathing correctly. When the patient is lying in the complete recumbent position with head slightly elevated, the diaphragmatic breathing will be materially aided by placing a very small pillow or a folded bath towel under the small of the back. Sometimes a belt or bandage, pinned or buckled so that it can easily be removed, if the patients, especially those in the advanced stage of the disease, have a feeling of suffocation, may be put around the upper portion of the thorax to help limit the breathing to the lower lobes. When in the recumbent position, a water bag or a bag filled with sand or small shot, weighing from four to five pounds, placed across the sternum, will often answer the same purpose.

If by this controlled diaphragmatic breathing the patient is able to reduce his respirations from twenty per minute to ten, he has spared his lung 3,000 movements in five hours. Many patients from the very start can reduce the number of their respirations to eight, seven, and even fewer per minute. Professor Saugman of Denmark experimented on himself, prior to instituting the treatment in his sanatorium, and wrote me: "I tried this method and was able to reduce my respirations to three and a half per minute." Furthermore, it is known that with each normal heart beat four foot-pounds of energy is exerted, and if by reduced and restricted breathing we save the heart only two or three contractions per minute, we conserve 2,400 to 3,600 foot-pounds of

energy in five hours. Lastly, diaphragmatic breathing will cause a better circulation in the lower extremities and abdominal viscera; especially aiding the hepatic function, all of which is so essential for patients who are ordered complete physical rest on a reclining chair or bed.

This diaphragmatic breathing is contra-indicated whenever it causes pain or increases existing pain or cough of no matter what origin. Envolvement of the lower lobes and excessive emphysema causing additional discomfort are self-evident contra-indications.

In conclusion let me say that, prior to my making clinical experiments, I demonstrated this controlled diaphragmatic breathing before Dr. Graham Lusk, Professor of Physiology of the Medical College of Cornell University. He assured me that there was no possibility of accumulating carbon dioxide in the human system, since the total gaseous exchange remains approximately the same whether there are seven or fifteen respirations per minute. Through the courtesy of Professor Lusk and his assistant, Dr. T. P. Barr, I was permitted to make some spirometric tests, whereby it was clearly demonstrated that with diaphragmatic breathing the amount of tidal air was even increased instead of decreased.

I shall be indebted to any of my confrères if they will give this method a thorough trial, not only in pulmonary tuberculosis, but also in ordinary bronchitis and bronchiectasis, and honour me with a report of results after three or four months of trial. For this I shall be deeply grateful. To those desiring more detailed information I will be glad to send additional literature.

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THE SIGNIFICANCE OF LUNG REST IN THE TREATMENT OF PULMONARY TUBERCULOSIS.

By SAMUEL HENRY STEWART,
M.D. (EDIN.),
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A general survey of the treatment of pulmonary tuberculosis leaves the impression that the individual has been almost forgotten. If I might put it epigrammatically, the treatment of tuberculosis has become a plea for the adoption of health principles. This standpoint has led me to consider what aids the physician might lend to Nature in

her efforts to overcome tuberculous disease in the lungs. Each weapon in the ever-increasing armoury of therapeutics has gradually been relegated to a less important place. In consequence the manifestations of tuberculosis in the human body have been studied with the object of ascertaining what indications might be forthcoming with regard to treatment.

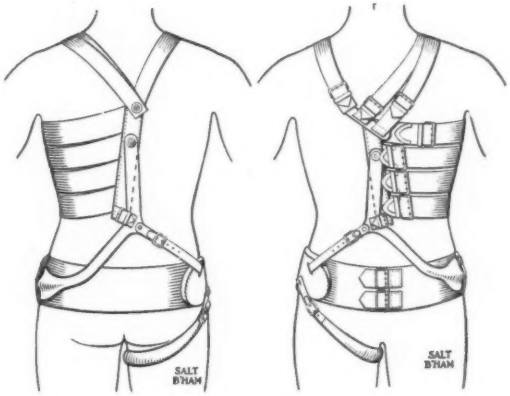
The first fact that impressed me was that fatal tuberculosis was associated mainly with organs in movement. I next noticed that immobilization of tuberculous organs where possible had a distinctly beneficial effect. One of the first manifestations of tuberculous disease is muscular rigidity. This factor is seen in pulmonary lesions, and where disease is undergoing repair retraction and reduction of movement is effected. That healing is primarily a local effort is evidenced by the fact that one part of the same organism can undergo repair while disease in another part is advancing.

To reduce as far as possible toxæmia and the incidence of metastases, and also promote repair of the diseased focus, it seems to be essential as a first step in treatment that one should seek to bring about a resting condition of the lung. The question of the best means of attaining this object is somewhat difficult of solution. The method adopted must preferably be such as is capable of comparatively wide application. Since we are dealing with a chronic disease, it must restrict to a minimum degree those conditions which promote a healthy state of the body. In the event of healing being effected the patient's physique must be impaired as little as possible.

How far do the methods of immobilization practised at present meet these postulates? I do not think we have justification for condemning artificial pneumothorax, when patients are properly chosen. No doubt the comparative avascularity resulting from the compression of the diseased organ must be regarded as undesirable in certain directions. It is just possible that the tubercle bacillus regards a compressed lung as an excellent field for reproduction. It has seemed to me that this might be an explanation of the less satisfactory nature of the ultimate results of this operation, for expansion is inevitable afterwards. Artificial pneumothorax is limited, firstly by the choice of patients, and secondly by the amount of time necessary to produce and maintain it. Thoracoplasty has not been practised to an extent which justifies a summarized opinion. It is felt, however, that in the event of healing resulting the patient's physique would be considerably impaired.

Several attempts at restriction of lung movement have been introduced. These methods have the disadvantage that they restrict both lungs to practically the same degree, and if applied only to the upper thorax, lung movements are such that the zone of extension must be disturbed in a manner rendering circumscription difficult. With the

object of restricting lung movement, and at the same time meeting as far as possible the adverse factors raised in the preceding paragraph, I devised what I have called a "Lung Splint."[1] The accompanying illustration will show that the pelvis is chosen as the main basis of counter and stability. The fulcrum, through which the whole device acts, is arranged at a point which may be regarded as that where spinal movements independent of the pelvis cease. The supplementary levers are attached to the upper arms of the supporting member at a distance above the fulcrum corresponding to that from the fulcrum to



"LUNG SPLINT" APPLIED TO THE CHEST OF A PATIENT WITH TUBERCULOUS DISEASE OF THE LUNG.

the lowest point of the part encircling pelvic bone. The proportions of the supplementary levers are arranged to recognize the fact that every point in the spine moves through an arc greater than that below. When the straps are in position and the lower ends of these supplementary levers attached as shown in the illustration, movement of the patient to either side increases the tension of the restraining straps. To apply the splint the patient expires and the straps are comfortably tightened. The tension is gradually increased over the first ten days. Thus the patient becomes inured, and at the same time the possible stretching of the various straps is exhausted. A garment is preferably worn next the skin. The device is worn continuously at present, and the patient is free to carry on ordinary duties.

My experience in the use of this splint has been already published

[1] The "Lung Splint" is made by Messrs. Salt and Son, Ltd., 5 and 6, Cherry Street, Birmingham.

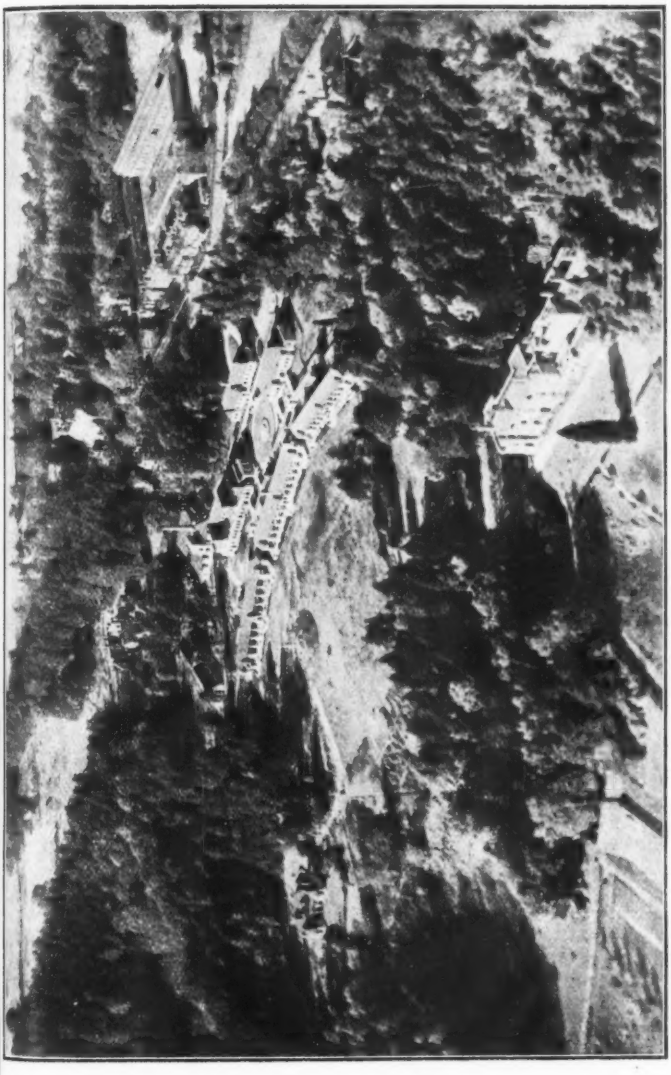
elsewhere,[1] and since writing the article referred to I have gathered further evidence of the fact that the restriction of movement shown spirometrically and radiographically leads to a very definite lessening of the systemic effects of pulmonary tuberculosis as manifested by symptoms and blood pressure. Associated with splinting there was also very considerable clinical evidence of improvement in the lung lesion, as shown by reduction of sputum, etc., and the clearing up of physical signs.

Let me emphasize, in conclusion, that these observations are of a preliminary character, and that it is recognized that the patient's natural resources must not be exhausted before splinting is introduced. Nature in this connection is the true physician, the lung splinting serving only to promote that rest without which Nature's efforts at healing are greatly handicapped. Disease in the upper third of the unsplinted lung would seem to be benefited, while the lower two thirds, which is the part on which the main respiratory functions devolve, would appear to have its disease ultimately aggravated. It is not possible at the present stage of my investigations to make any definite statement as to contra-indications.

[1] See "Lung Splinting in the Treatment of Pulmonary Tuberculosis," *British Medical Journal*, March 10, 1923.

ASSOCIATIONS AND INSTITUTIONS.

THE HEATHERWOOD HOSPITAL.



AERIAL VIEW OF THE HEATHERWOOD HOSPITAL FOR TUBERCULOUS CHILDREN.

In the foreground is the nurses' home, previously the estate mansion. In the centre are the three wards, facing south. To the right, behind the wards, is the treatment block. At the back centre is the administration block, and to the left the kitchen, stores, and staff dining-rooms; behind are the power-house and laundry, and to the left is the isolation block. On the extreme left is the Resident Medical Superintendent's house.

A HOSPITAL and school, with accommodation for 150 boys and girls up to the age of fourteen, has recently been established by the United Services Fund at Heatherwood, Ascot. The place has been designed and constructed for the treatment of cases of "surgical tuberculosis" occurring among the children of men and women who served in the Great War. Cases sent to the hospital by public authorities are admitted at the rate of 25s. per week, on the understanding that no contribution is asked for from the parents or guardians where the income is below £250 per annum. The treatment adopted is on modern conservative lines, and with the application of heliotherapy as far as possible. Cases of pulmonary tuberculosis and adolescents over the age of fourteen are not admitted. Candidates for admission must be the children of men or women who have served their country in the Great War. It is hoped that it may be possible to retain each patient in the hospital until cured. The Committee have approached various well-known physicians and surgeons to act as their consultants, and prominent amongst these is Sir Henry Gauvain, K.B.E., M.D., Medical Superintendent of the Lord Mayor Treloar Cripples' Hospital, Alton and Hayling. Anyone desiring to secure the admission of a child should apply to the Secretary of the United Services Fund, 29, Cromwell Road, S.W. 7. An illustrated booklet giving a full description of the hospital can be obtained on application. Medical advisers are cordially invited to visit the hospital.

In connection with the Ninty-first Annual Meeting of the British Medical Association at Portsmouth, there will be a Tuberculosis Section, the President of which is Sir Henry Gauvain, M.D. On July 25 and 26 discussions will be held on The Artificial Light Treatment of Lupus and other Forms of Tuberculosis; The Present Position of the Surgical Treatment of Pulmonary Tuberculosis; Social Aspects of Tuberculosis, with Special Reference to Infectivity.

The Davos Medical Association is holding a post-graduate course on "Tuberculosis and the Climate of the High Alps" for medical practitioners, August 19 to 26. Lectures will be given in French and German. No charge will be made for the course, and there will be special terms for board and residence and reduction in railway fares. Application for further particulars should be addressed to the Davos Scientific Institute, from whence a programme of the course can be obtained.

In June of this year Dr. Muthu, of the Mendip Hills Sanatorium, completed twenty-four years of sanatorium work, and entered upon the twenty-fifth year of his medical service. He has been one of the early pioneers of the sanatorium cause, has made extensive tours in Germany and Switzerland to study the methods of treatment, has known personally Dr. Dettweiller of Falkenstein, and Dr. Walther of Nordrach, and has written several publications on tuberculosis.

NOTICES OF BOOKS.

HELIOTHERAPY.

ROLLIER, HELIOTHERAPY, LEYSIN—these three words are associated in the minds of progressive medicals throughout the world. Dr. Rollier has just issued a remarkable exposition of the principles and practices of heliotherapy as carried out in his numerous clinics at Leysin.[1] Certain of his colleagues have collaborated in the production of this notable work. For some time this journal has sought to direct attention to the fine service which Dr. Rollier has rendered in evolving a really scientifically directed system for the conduct of effective conservative treatment of so-called "Surgical Tuberculosis," and since 1921 Dr. Saleeby with great enthusiasm has expounded both in professional journals and in the lay press the essentials of sun treatment as carried out at Leysin. Dr. Rollier's volume is opportune, for the medical profession and the general public are alive both to the importance of heliohygiene as a means for the prevention of disease and to the value of heliotherapy as an agent in the recovery from certain morbid conditions, particularly those of a tuberculous nature. A committee appointed by the Minister of Health is now engaged in investigating the subject in all its bearings. Dr. Rollier's new book is not to be viewed as an English version of his monograph "La Cure de Soleil," but is a new work, which in addition to his own contributions contains important sections by three of his assistants. Sir Henry Gauvain in an appreciative foreword acclaims Rollier as "High Priest of the Modern Sun Worshippers," and adds, "To those unacquainted with his great work it will come as a revelation; to those familiar with it as a great inspiration." Sir Henry goes on to say: "For the first time his full technique is available to the English medical public, and I suggest that when his methods have been assimilated and have been applied more generally the sum of human suffering will be sensibly diminished, the standard of improvement achieved, and the speed in which these results are attained will be sensibly increased." Dr. C. W. Saleeby also supplies a sympathetic foreword, in which he declares that "Nowhere on earth have I seen or heard tell of anything so beautiful, so significant, so hopeful as the application of heliotherapy under the charge of Dr. Rollier." The writer was privileged to enjoy the hospitality of this pioneer at his first course of Post-Graduate Lectures and Demonstrations at Leysin, and can testify to the magnificent work which is being carried out in the clinics at this beautiful Alpine health station. Dr. Rollier's new work is mainly devoted to the consideration of heliotherapy as applied to "Surgical Tuberculosis," a term which

[1] "Heliotherapy." By A. Rollier, M.D., Medical Director of the Institutions for Heliotherapy, Leysin. With the collaboration of A. Rosselet, D.Sc., M.D., H. J. Schmid, and E. Amstad, M.D. With Forewords by Sir Henry Gauvain, M.A., M.D., and C. W. Saleeby, M.D., F.R.S.E. Pp. xxii + 288, with illustrations. London: Oxford Medical Publications, Henry Frowde and Hodder and Stoughton, the *Lancet* Building, 1, Bedford Street, Strand, W.C. 2. 1923. Price 25s. net.

at the very outset he condemns as a misnomer. Tuberculosis wherever situated is a general disease, presenting local manifestations, and as such demands treatment directed towards the improvement of the general health; such local treatment as is necessary must in no way counteract this indispensable "disinfection" of the body. Rollier opened his first clinic at Leysin in 1903. To-day there are twenty-eight clinics with provision for something like a thousand cases under his direct supervision. Dr. Rollier's book begins with a short historical introduction, and then the author enters upon a detailed consideration of the therapeutic action of the sun-bath and explains in detail the general technique. The importance of experienced and skilful regulation and supervision is insisted upon. An ignorant, reckless, or even incautious employment of sun treatment may result in serious and even fatal accidents. The dosage of insolation is a matter of great importance, and before sun-baths are commenced the patient must have become accustomed to life at the altitude of Leysin—nearly 5,000 feet—and have entered upon an open-air régime. In all cases it is essential to insist on the necessity for an individual study of each patient and careful progression in the application of insolation. The question of pigmentation and reaction of the skin calls for fullest consideration. "Once the skin is well pigmented over the body there is no longer any danger of over-exposure." A tuberculous patient when subjected to insolation usually manifests a general reaction and oftentimes a very definite focal reaction. Dr. Rollier writes: "The technique we have finally adopted for the sun-bath has been evolved during a number of years of experience, and is the one which we have found empirically to be the safest; this method consists in beginning with the feet and insolating both legs and arms before exposing the abdomen and thorax. By this means we are able to get a general idea of the tolerance of the patient to sunlight before the more vulnerable parts of the body are exposed. . . . We must also emphasize the importance of using short periods of insolation (ten to fifteen minutes) alternately with periods of rest (five to ten minutes). We find that a series of moderate reactions three or four times a day (ten to fifteen minutes) is more beneficial and causes more rapid acclimatization than is the case with a single period of thirty minutes." Insolation should only be practised when the air is relatively cool, and a hot-air bath is prejudicial. At Leysin, which is an ideal centre for sun treatment, patients usually have their insolation in the summer between 6 a.m. and 9 a.m. For most patients these hours of exposure daily are sufficient. "If in certain special cases chemically active rays, which are more powerfully bactericidal, be required for the treatment of superficial lesions or secondary infected wounds, exposure may be allowed between 11 a.m. and noon, when the ultra-violet rays are at their maximum intensity; in such cases very short periods with frequent interruption are necessary." Special sections are devoted to detailed description of regional heliotherapy, and these are illustrated by valuable reports of actual cases with photographs and skiagrams. Dr. Rollier is not only a clinician of great experience, but possesses the soul of a pioneer and has the vision of an independent initiator, and yet he manifests in all his teaching sound practical sense and a recognition of the importance of details in regard to the carrying out of methods and the construction of appliances. Generally speaking, he has no use for the customary open surgical

operative measures, and it is only in exceptional cases that he recommends aspiration or the injection of chemical agents into tuberculous abscesses or along sinus tracts. Plaster appliances he has for long discarded as being seriously obstructive to the healing influences afforded by air and light. Many of his appliances for the maintenance of local and general rest are highly ingenious, and yet simple, comfortable, and effective. In spinal cases, except when situated in the cervical or upper dorsal regions, when the disease has become fairly quiescent, the prone or ventral position is advocated. By increasing lordosis it reduces pressure on the vertebral bodies, diminishes kyphosis, and permits of direct insolation of the back, so allowing of stimulation of skin and development of muscles. Certainly sun baths lead to the production of a magnificent muscular corset. Rollier is a great believer in the psychological value of work both during and after treatment, and he devotes an important section to the consideration of the "Work Cure" and also indicates his views as to the rôle of "the working colony." In the chapter on Heliohygiene a description is given of the École au Soleil near Sepey in the Ormont Valley of the Vandois Alps, and delightful pictures are given of the scholars at work in the sun both during summer and winter. Dr. A. Rosselet, Lecturer on Physiotherapy at the University of Geneva, contributes a particularly lucid and suggestive study of "The Scientific Basis of Heliotherapy," in which he surveys our present knowledge regarding the physical and biological factors. We venture to quote his conclusion: "In heliotherapy success must not be attributed solely to the action of light, as the quality of the air breathed and of the nutrition absorbed with rest are also factors of great importance. On the other hand, it would be a mistake to look upon light merely as an adjuvant to these other factors determining the cure. The frequent observation of a close parallelism between clinical progress and sunny weather demonstrates the value of sun treatment. The direct local action of light on a deep-seated tuberculous lesion has neither proved nor disproved it; it would be therefore a mistake if, in the present state of our knowledge, it were to be denied categorically. The indirect action is well founded on fact: light absorbed by the skin gives rise to numerous and useful reflexes; absorbed by the blood, the energy given out by radiations is stored and carried in the blood-stream to every part of the body; when liberated, it stimulates the intracellular processes of oxidation and reducation. This condition is the probable explanation of the increased metabolism of the body, of the improvement in the general health, of the increased resistance to disease both present and threatened." Dr. H. J. Schmid, Radiologist to the Rollier's Clinics, provides an able disquisition on "The Radiological Diagnosis of Osteo-Articular Tuberculosis and the Radiographic Control of the Clinical Results of Heliotherapy." He claims that, speaking generally, radiological examination in surgical tuberculosis shows: (1) That the extent of a tuberculous affection is usually greater than a purely clinical examination would lead us to suppose. (2) That the time taken for the evolution of a tuberculous process varies according to the virulence of the organism involved, the resistance of the individual affected, the localization of the disease, and the blood-supply of the region involved; the age of the patient is also a factor of importance. (3) After the complete disappearance of clinical symptoms, changes concerning the transformation and recalcifi-

cation of bone have still to be carried out. Radiological signs always lag considerably behind the clinical. (4) With regard to differential diagnosis, radiological examination usually gives the answer before clinical methods can do so. Dr. E. Amstad contributes a chapter on The Adjuvants of Heliotherapy, in which he gives special consideration to radiotherapy and phototherapy, and also a further chapter on Heliotherapy of Non-Tuberculous Diseases, in which he shows that good results have been obtained in the treatment of the convalescent from acute disease, subjects of general debility, certain deranged blood states, Hodgkin's disease, rickets, rheumatism, syphilis, and certain types of chronic renal disease. There is also a statistical statement, in which returns, as far as are available, are presented regarding patients who have been treated at Leysin since 1903. The work closes with a valuable bibliography of Dr. Rollier's publications. This all too short review gives but a very imperfect picture of this impressive book. To understand the scientific thoroughness and effectiveness of the investigations and treatment which is being carried out by Dr. Rollier and his colleagues at Leysin a visit must be paid to this charming and ideal mountain health station. The fine work which lies before us affords a convincing argument for the application of heliotherapy, particularly in what have hitherto been designated "surgical forms of tuberculosis." Although Leysin may be pre-eminently suited for the successful carrying out of the sun treatment, and although it is certain that none can claim to have enjoyed such long experience of heliotherapeutic practice as Dr. Rollier, yet it must be remembered that the truths set forth in this authoritative book are in more or less measure applicable in almost all parts of the world. Tuberculosis is a malady which threatens the health and happiness of mankind in all lands, and if the studies of Dr. Rollier and his colleagues mean anything, they indicate that in heliohygiene and in heliotherapy we have natural powers which, when scientifically applied, go far to assist in the prevention and arrest of tuberculosis. Every medical adviser should study this epoch-making work in its entirety. Special thanks should be given to Dr. and Mrs. Andrew Morland for the excellence of the translation. The publishers have issued the book in a form worthy of this notable work.

T. N. Kelynack, M.D.

A TREATISE ON TUBERCULOSIS.

Professor Loewenstein, engaged for twenty years as a specialist in tuberculosis, having felt the need of a comprehensive book on the treatment of tuberculosis in its various ramifications, has sought to fill this gap in medical literature by the issue of a comprehensive work in two volumes which should deal authoritatively and in great detail with the numerous therapeutic means at our disposal in the treatment of the various medical and surgical diseases caused by the tubercle bacillus. To accomplish this task, Professor Loewenstein has enlisted the co-operation of thirty-six experts, and the volume before us is the first instalment of the projected work.[1] It consists of eighteen articles, con-

[1] "Handbuch der Gesamten Tuberkulose-Therapie." Herausgegeben von Professor Dr. Med. Ernst Loewenstein. Band I., S. 1044. Mit 56 Textabbildungen und 6 teils Mehrfarbigen Tafeln. Berlin and Wien: Urban and Schwatzenberg, 1923.

tributed by as many authors. Professor Teleky writes on the statistics of tuberculosis, dividing his article into two parts. The first part, with which the book opens, consists of thirty-eight pages, and deals somewhat exhaustively with the statistics of tuberculosis deaths. The second portion of the article, which starts on p. 343, and occupies another twenty-two pages, is devoted to a consideration of the results of institutional treatment from the statistical standpoint. The second article, of thirty-seven pages, is from the pen of Professor Liebermeister, and discusses tuberculosis of the vascular system. Professor Hausmann is responsible for the next article, of twenty-six pages, on the anatomical and clinical forms of pulmonary tuberculosis. The other articles in this volume are as follows: "The Physico-Chemical Principles of Radio-Therapy," by Dr. Gassul; "Mountain Climate," by Dr. Amrein; "The Therapeutic Value of Sea Climate and Sea Water," by the late Professor Glax; "The Construction of Institutions for the Treatment of Tuberculosis," by Dr. Frankfurter; "The Selection of Patients for Institutional Treatment," by Dr. Karl Meyer; "The Sanatorium Treatment of Pulmonary Tuberculosis," by Dr. Grau; "Pregnancy and Tuberculosis," by Dr. Frischbier; "Theoretical Considerations about Inhalation Treatment," by Professor Heubner; "Inhalation and Pneumato-Therapy," by Dr. Ostermann; "Respiratory Exercises," by Dr. Hofbauer; "The Campaign against Tuberculosis in Various Countries" (three articles), by Dr. Götzl of Vienna, Dr. J. Walsh of Philadelphia, and Dr. J. B. Darder-Rodés of Barcelona, respectively. The volume concludes with an article by Professor Durig on the physiological principles of nutrition. We have no hesitation in saying that each contributor has carried out his task well, but we venture to suggest that some of the articles, however excellent their substance, are out of place in a work nominally devoted to treatment. We fail to see, for instance, the relevance of tables of mortality statistics to a book of this kind. Again, Professor Liebermeister's essay on vascular tuberculosis would form a splendid chapter in a "System of Tuberculosis," but we are at a loss to understand what useful purpose a consideration of the pathology, morbid anatomy (macro- and microscopic), clinical manifestations, diagnosis, and prognosis of vascular tuberculosis, covering altogether no less than thirty-six pages, can serve for the doctor who has to treat this condition. The portion of the article devoted to actual treatment occupies about one page, and this should have been all the space allotted to the subject in a book on therapeutics. Similar criticism applies to Professor Hausmann's article. Indeed, we are of opinion that the whole of the first ninety-six pages should have been omitted as irrelevant. Dr. Frankfurter's article would have profited by a few well-chosen illustrations. Apart from these minor faults, we have formed a very high opinion of the book, and can earnestly recommend it as a valuable guide to any doctor who is in charge of tuberculous patients.

W. M. Feldman, M.D., F.R.S. (Edin.).

ENVIRONMENT AND RESISTANCE IN TUBERCULOSIS.

In the American world of tuberculosis Dr. Krause is well known, and his writings partake of that broad philosophical spirit which distinguishes the Johns Hopkins school. Hence we welcome the

recently issued volume,[1] which contains two papers from his pen, as an original and stimulating presentation of important aspects of tuberculosis in clear and attractive form. To Dr. Krause environment spells not only good physical hygiene, but all things that enter into the experience of a human being; and his view is that, as regards tuberculosis, any experience that may modify the origin and development of infection is an environmental influence. It may be urged that this view is too inclusive, but, at any rate, it is likely to lead to less misunderstanding than a concept which is too narrow. As regards resistance, the author's argument is that non-specific factors can play a decisive part in contributing to a result which has all the appearances of being due to resistance or susceptibility to infection and disease. Activity or latency, at times, are determined by purely accidental factors of time and place of infection capable of exciting tuberculous foci to renewed vigour. In addition, there is always another mechanical resistance which interposes two important barriers between germ and host: these are the systems of lymph nodes, and the investing wall of the tubercle. Allergy or specific hypersensitiveness is shown to be a property of the anatomic tubercle, which also brings about other deep-seated changes in the animal body, such as specific immunity. Successful immunization is admitted by the author to be accomplished only by one method, and that is by preliminary infection with living bacilli. Hence tuberculin "has no immunizing action in the sense that it will protect against infection," and in practice is only applicable in proportion as the symptoms of intoxication are in abeyance. This treatise can cordially be recommended to tuberculosis workers, who will find it well worth the time spent in perusal. J. F. HALLS DALLY, M.D.

TUBERCULOSIS PROBLEMS.

Sir James Kingston Fowler has issued a supplemental volume to his stimulating study of "Pulmonary Tuberculosis." It deals with certain questions relating to the administrative aspect of tuberculosis services for men.[2] The work opens with a chronologically arranged enumeration of the landmarks and incidents in the struggle against tuberculosis. "The word 'struggle' has been adopted in preference to 'campaign,' which is in more general use, as it appears to express more fully the idea of continuity, whereas a campaign has a beginning and an end. When this struggle began no man knows, when it will end no one can tell." The following chapters deal with the Prevalence and Mortality of Tuberculosis, Infection Diagnosis, The Tuberculosis Service, Notification, The Tuberculosis Dispensary, The Sanatorium,

[1] "Environment and Resistance in Tuberculosis," by Allen K. Krause, A.M., M.D., Associate Professor of Medicine, Johns Hopkins University; Director Dow's Tuberculosis Research Fund, Johns Hopkins University; Physician in Charge, Phipps' Tuberculosis Dispensary, Johns Hopkins Hospital; Lecturer, Trudeau School of Tuberculosis; Editor, *American Review of Tuberculosis*. Pp. 137. Baltimore, U.S.A.: Williams and Wilkins Company, Publishing Department, Mt. Royal and Guilford Avenues. 1923. Price $1.60.

[2] "Problems in Tuberculosis: Administration, Diagnosis, Employment, Settlements." By Sir James Kingston Fowler, K.C.V.O., C.M.G., M.A., M.D., D.Sc., F.R.C.P., Consulting Physician and Emeritus Lecturer on Medicine, the Middlesex Hospital, etc. Pp. ix+64. London: Henry Frowde and Hodder and Stoughton, Oxford Medical Publications, the *Lancet* Building, Bedford Street, Strand, W.C. 2. 1923. Price 5s. net.

The Settlement, The Hospital Department, Industries, After-Care Committees, and Domiciliary Treatment. Sir James Fowler does not hesitate to indicate the weak places in our tuberculosis schemes and services, and his criticisms are generally just and timely. With regard to improvements in sanatorium management the following points are presented: (1) Selection of the cases for the sanatorium by physicians competent to diagnose the disease, and with a long clinical experience of its manifestations; (2) elimination from the sanatoria of all patients that are not really suffering from pulmonary tuberculosis; (3) the removal of any limit to the duration of the treatment if, in the opinion of the physician, arrest of the disease and, later, one "obsolete lesion" may be hoped for; (4) all readmissions to be to the hospital block, and not to the sanatorium block, unless the physician in charge considers the case exceptional; (5) the recognition of the fact that the sanatorium is now only a part of the Settlement; (6) the visitation of the public sanatoria by physicians of experience in the disease.

The following indicates the author's conception of a complete scheme for a tuberculosis settlement:

THE SETTLEMENT

- Sanatorium Department
  - Diagnosis Ward.
  - Clinical Ward.
  - Operating Theatre—Visiting Surgeons.
  - X-ray Installation.
  - Clinical Laboratory.
  - Sanatorium Block.
  - Graduated Labour.
- Hospital Department
  - Hospital Block.
- Industries Department
  - Huts.
  - Hostels.
  - Cottages.
  - Workshops—
    - (*a*) Training.
    - (*b*) Handicrafts.
  - Outdoor Industries.
  - Sale of Produce.

The volume is one which contains many practical suggestions, and it should be studied without prejudice by all superintendents of sanatoria and tuberculosis officers. Not the least interesting and informing section of the book is the concluding chapter, with its striking *obiter dicta*. We take the following as samples: "A working man has no time to be an 'early case' of pulmonary tuberculosis." "Once notified, always tuberculous." "A sanatorium is an atmosphere, not an institution." "Strange things may happen when a clinician who has 'scrapped his stethoscope' calls in a radiographer who is not a pathologist." "A school for tuberculosis officers is a necessity." "A light occupation in the open air is rarely found." "When the governing class has learnt the A B C of science, more may be hoped from the general public." We are glad to see that the book is dedicated to Dr. P. C. Varrier-Jones, whose pioneer work and statesmanlike services as

an administrator in connection with the founding and development of the Cambridgeshire Tuberculosis Settlement at Papworth deserves fullest recognition.

MEDICAL CLIMATOLOGY.

Every medical adviser, and especially all who have to deal with cases of tuberculosis, should study the principles and practice of medical climatology. Dr. E. Hawkins has provided a remarkably informing and helpful guide to the climate of England and Wales.[1] The author set himself the task of producing a scientific and yet practical manual on the probable climate of actual and potential health resorts, places of education, and main centres of population, using as a basis the data issued by the Meteorological Office. Medical practitioners and others interested in the study of climatology in its relation to the prevention of disease and the restoration of the disordered will find the effectively arranged, reliable, up-to-date information so pleasingly presented in this volume of the greatest assistance. The work opens with a discussion of the geographical and meteorological factors in climate and their physiological effects, and this is followed by an excellent summary regarding the climate of the British Isles. Then follow a series of chapters in which the various districts are considered—inland, seaside, riverside, etc. A special chapter is devoted to Greater London. The work closes with an excellent study of the therapeutics of the English climate. In the appendix is a seasonal therapeutic guide to health resorts and a section on spas. There is a particularly serviceable index and therapeutic guide. In it are the names of a number of places which claim to offer special advantages for tuberculous subjects. The following suggestions are given as to the selection of a climatic station for phthisical cases: "When one apex only is affected, open-air life in any climate will be probably quite sufficient; but with both sides in trouble, or with a cavity, mild or warm districts are necessary in winter, with cool or more bracing places in summer. Always choose a climate which allows the greatest amount of time to be spent in the open air, so as to increase the resisting powers of the patient. Avoid hot places in summer, owing to the depression and loss of appetite produced, and to the risk of possible chill if a cool breeze sets in and increases the humidity. High altitudes, which in other parts of the world have been found so satisfactory in bracing up the lung, are scarcely sufficiently dry, sunny, and free from wind in the British Isles; but when there is no ulceration, no bronchitis or emphysema, and no serious cardiac lesion, places like the borders of Dartmoor, and many others at a slightly lower elevation, may be visited in summer." A useful list of suggested centres is given. Dr. Hawkins has provided his monumental volume with a splendid series of ingeniously constructed and effectively printed charts, most of them in colours.

[1] "Medical Climatology of England and Wales." By Edgar Hawkins, M.A., M.D., D.P.H. Pp. xiv+302, with 149 charts (144 in colours). London: H. K. Lewis and Co., Ltd., 136, Gower Street, W.C. 1. 1923. Price 25s. net.

MANUALS FOR MEDICAL ADVISERS AND WORKS OF REFERENCE.

Examiners, editors, and all who have to write or read medical theses and scientific papers will be grateful to the Regius Professor of Physic in the University of Cambridge for the provision of a new and revised edition of his invaluable "Guide to Composition," which was first issued in 1904.[1] The work is of unique practical value to students of medicine and other scientific workers, and is also an exposition which all lovers of grace, beauty, truth, and power in English prose will appreciate, for it is written by a master who is a rarely endowed and accomplished scholar, a great teacher, and a well-beloved physician, respected, trusted, and honoured by Britishers in all parts of the world. Sir Clifford Allbutt furnishes in his peculiarly charming little volume invaluable advice regarding the choice of subjects, titles, and forms for scientific essays, with serviceable suggestions regarding collection of materials, methods in composing, misuse of words, irritating mannerisms, exuberances, tautology, redundancy, split infinitives, and the like. The volume is full of wisdom and sound, helpful common sense, and all is set forth in a form characterized by literary distinction. Here are the concluding words: "Force, lucidity, unity, simplicity, economy of expression are virtues which we may all attain; originality will be as God pleases." And here is the closing sentence of the most winsome, personal, and illuminating preface: "Finally, let us hug the truth, whether it be of imagination, fancy, wit, humour, knowledge, or word, remembering the doctrine of Plato: 'False words are not only in themselves evil, but they infect the soul with evil.'"

"The Medical Annual" is so well known and universally valued that to remind medical practitioners that the 1923 issue, the forty-first year edition, is now available should be sufficient to secure its addition to every doctor's group of indispensable reference works.[2] The current volume contains signed summaries more or less critical, and in some cases having a distinctly personal note from no less than thirty-two contributors. The late Dr. Arthur Latham, with Dr. J. A. Torrens, furnish a comprehensive epitome of work relating to pulmonary tuberculosis; Dr. E. Graham Little treats of tuberculosis of skin; and Sir John Thomson-Walker refers to tuberculosis of the penis and the kidney. There is a serviceable directory of sanatoria. The work is admirably planned, and, generally speaking, the contributors have done their respective sections effectively, while the publishers have produced all in a thoroughly worthy form. The general index and other indexes are all first-class, and the illustrations are numerous and instructive. As a reliable means for keeping the busy practitioner abreast of the times "The Medical Annual" accomplishes a professional and humanitarian service of the greatest value.

[1] "Notes on the Composition of Scientific Papers." By the Right Hon. Sir T. Clifford Allbutt, P.C., K.C.B., M.A., M.D., D.Sc., LL.D., F.R.C.P., F.R.S., Regius Professor of Physic in the University of Cambridge, etc. Third edition. Pp. xiii + 192. London: Macmillan and Co., Ltd., St. Martin's Street, W.C. 1923. Price 6s. net.

[2] "The Medical Annual: A Year-Book of Treatment and Practitioner's Index." Forty-first year. Pp. xcvi + 600 + 143, with plates and figures. Bristol: John Wright and Sons, Ltd. 1923. Price 20s. net.

Dr. Owen Paget's method for the treatment of tuberculosis by the nasal insufflation of bacillary emulsion is described elsewhere in this journal (see p. 144). All who desire to make use of this procedure should, however, first study Dr. Paget's concise and informing manual.[1] Vice-Chancellor Adami's introduction is sympathetic and suggestive, and he urges that Dr. Paget's work has "at length reached the point at which it is right for his method to be brought to the notice of others, to the end that it may be fully tested." He shows that the investigations of Besredka and Pfenninger are exactly parallel with Paget's clinical observations. Fleming's researches would also seem to support Paget's views. Dr. Birmingham testifies to the excellence of the results obtained by Paget's method. The monograph is certainly a helpful presentation of facts and theories relating to immunity, and would seem to point the way to a new and promising path towards an effective form of treatment of tuberculosis.

In many cases of pulmonary tuberculosis, and in some where the tuberculous lesions involve parts of the body other than the lungs, when operative measures are required serious disadvantages, and even grievous risks, arise from the use of a general anæsthetic. It is well, therefore, that medical advisers should make themselves fully acquainted with the best methods of regional anæsthesia. These are now fully described in a work recently issued by Dr. B. Sherwood-Dunn.[2] The procedures advocated are according to Victor Pauchet's technique. The volume comes to us from America, and is an excellent guide, detailed and explicit in text, and elaborately illustrated. The anæsthetic approved is neocaïne-surrénine (Corbière), a French preparation which is an efficient substitute for the German novocaine-adrenalin. Dr. Sherwood-Dunn advocates the use of pure procaine, the designation now in general use in the United States for neocaine or novocaine.

A new edition has just been issued of Dr. Lawrason Brown's concise, lucid, reliable, and thoroughly practical and helpful guide for patients seeking recovery from pulmonary tuberculosis.[3] The manual is written in simple, direct, non-technical language, and is just the clear, detailed, dogmatic presentation of truths, methods, and general practices which the medical adviser can with all confidence pass on to his patient, knowing that it will help greatly in furthering that co-operation between doctor and patient which is essential for success. The author of this common-sense and yet scientifically directed popular guide is a worthy disciple of the wise, brave, optimistic pioneer Trudeau, of Saranac Lake.

[1] "A Simple Treatment for Tuberculosis." By Owen F. Paget, M.D., of Perth, Western Australia. With an Introduction by J. George Adami, M.D., F.R.S.; and Prefatory Remarks by W. P. Birmingham, B.A., M.D., Hon. Surgeon Public Hospital, Fremantle, Western Australia. Pp. xxiii+80. London: Constable and Co., Ltd., 10-12, Orange Street, W.C. 2. 1923. Price 5s. net.

[2] "Regional Anæsthesia" (Victor Pauchet's Technique). By B. Sherwood-Dunn, M.D., Officier d'Académie; Surgeon (Colonel) Service de Sante Militaire de Paris; Physician to the Cochin Hospital. Pp. vii+294, with 224 figures in the text. Philadelphia, Pa., U.S.A.: F. A. Davis Company, 1914-16, Cherry Street. 1922.

[3] "Rules for Recovery from Pulmonary Tuberculosis: A Layman's Handbook of Treatment." By Lawrason Brown, M.D. Fourth edition, thoroughly revised. Pp. 217. Philadelphia, U.S.A.: Lea and Febiger, 706-710, Sanson Street. 1923. Price $1.50.

Professor J. A. Lindsay has recently issued a stimulating collection of wise and serviceable axioms and aphorisms which the medical student and young practitioner will find invaluable in clinical work.[1] We take the following from the section on Pulmonary Tuberculosis: "In pulmonary tuberculosis, what is inherited in certain cases is not the disease, but susceptibility to infection." "The infectivity of tuberculosis is the necessary corollary of the pathology, but the influence of the soil may outweigh the influence of the seed." "Dirt, overcrowding, bad ventilation, unhealthy trades, and malnutrition are the chief predisposing factors in pulmonary tuberculosis. The drop in the tuberculosis mortality in Great Britain began soon after the Repeal of the Corn Laws and the commencement of the era of cheap food." "The French School lays special stress upon alcoholism as a predisposing cause of tuberculosis." "Many cases of pulmonary tuberculosis are secondary to tuberculosis of the tracheobronchial glands." "In the diagnosis of incipient pulmonary tuberculosis, symptoms and history are more trustworthy than doubtful physical signs; symptoms are significant even in the absence of physical signs; the thermometer and the weighing-machine give invaluable help." And there are many other serviceable notes which will be of the greatest service to tuberculosis officers and others dealing with consumptive cases.

Mr. E. H. Taylor, of Welwyn, has written a thoroughly practical guide for beginners in beekeeping.[2] In some sanatoria bee culture provides an interesting an remunerative occupation. Those who on grounds of health, or for other reasons, are able to live the open-air life, will be well advised to study Mr. Taylor's illustrated and enlightening manual, and, if possible, commence the keeping of bees. Bees provide food for both mind and body, and this is just what most tuberculosis subjects require.

The new and sixth edition of "The Michelin Guide to Great Britain" is a reference work which every motorist should possess.[3] It is, indeed, a volume which all who travel in England, Scotland, and Wales, and everyone interested in practical data relating to cities and towns, roads, and other arrangements for transport and comfort, will find invaluable. There are notes relating to 1,915 towns arranged in alphabetical order, with descriptions of objects of interest, hotels, garages, repairers, and distances to neighbouring towns. No less than 297 town-plans in black and white are provided, with twenty town-plans in two colours, and a thirty-page road atlas. The work is truly the motorist's vade-mecum.

[1] "Medical Axioms, Aphorisms, and Clinical Memoranda." By James Alexander Lindsay, M.A., M.D., F.R.C.P., Professor of Medicine in the Queen's University of Belfast. Pp. viii + 192. London: H. K. Lewis and Co. 1923. Price 6s. net.

[2] "Bees for Beginners." By E. H. Taylor. Pp. ix + 130, with numerous illustrations. Welwyn, Herts: Bee Hive Works. 1923. Price 2s. 6d. net.

[3] "The Michelin Guide to Great Britain: The Motorist's Vade-Mecum." Compiled and published by the Michelin Tyre Company, Ltd., 81, Fulham Road, London, S.W. 3. 1923. Price 5s. net.

PREPARATIONS AND APPLIANCES.

TUBERCULINS.

MANY forms of tuberculin have been introduced and used in the treatment of various tuberculous lesions, and concerning the value and dangers of this agent there still exists wide difference of opinion. Dr. Owen Paget has recently strongly advocated what he designates "The Insufflation Treatment of Tuberculosis." He believes that the insufflation of very small doses of very finely comminuted dead tubercle bacilli gives results incomparably superior to those obtained by hypodermic injections, and is convinced that the epithelial cells of the ethmoid, superior turbinates, and nasal sinuses are capable of forming antibodies which, diffusing into the underlying vessels, are conveyed to tissues at a distance, where they either neutralize the toxins of the bacilli, or aid in the actual destruction of the bacilli. Dr. Paget finds that the best preparation for insufflation is obtained by powdering the Tuberculin B.E. Tablets prepared by Parke, Davis and Co., and he advises against the use of any other form of tuberculin.[1] The insufflator employed consists of a glass tube bent to a right-angle, one end tapering to a blunt tip, and the other connected by a rubber tube with a pneumatic bulb. The powder to be insufflated is poured into the wide end of the disconnected glass tube, gently tapping the latter to ensure that the powder lodges at the angle. The pointed end of the tube is then passed as high up the nostril as possible, resting the base of the upright portion against the upper lip, so that the point shall be directed towards the frontal sinuses, not backwards towards the naso-pharynx. The rubber tubing is then connected with the wide end of the glass tube, and by quick pressure on the rubber bulb the powder is blown on to the region of the ethmoid and superior turbinates —insufflations on the inferior turbinates are of very little value. Marked septal deflection, if present, must be rectified, otherwise insufflation by that nostril is of little, if any, use. The doses which Dr. Paget employs are $\frac{1}{8000}$ mgm., $\frac{1}{800}$ mgm., or $\frac{1}{40}$ mgm. of dried tubercle bacillary emulsion, according to the patient's condition. In acute cases with high temperatures minimal doses are employed. In old, unresolved, and fibrotic cases running low temperatures, larger doses can be used.

Tuberculin is also being advocated for administration by the percutaneous method. The method of procedure is to inunct the patient with a small fragment of the tuberculin ointment. In simple cases a

[1] The Paget T.B.E. Insufflation Outfit, containing two insufflation tubes, one rubber pneumatic bulb, and three tubes of the T.B.E. tablets, is supplied by Parke, Davis and Co., 50, Beak Street, Regent Street, W. 1, from whom full particulars regarding the method can be obtained. Reference should also be made to Dr. Owen Paget's recently issued book, "A Simple Treatment for Tuberculosis," published by Constable, price 5s.

strength of 25 per cent. is used to commence with. The ointment is applied to the previously cleansed selected area, about 2 inches square, and gently rubbed in by a suitable glass spatula. An application is made weekly, unless there is a marked reaction, and then the interval is suitably increased. Where the response is slight, the interval can be reduced to three or four days, or when the lower dose appears to give a feeble reaction the higher strength may be adopted. In young children a commencing application with 10 per cent. tuberculin ointment is recommended. In all cases attention must be paid *not only to the local response, but also to the focal and systemic effects.* The tuberculin ointment advocated is prepared from old tuberculin, made by the research laboratory of the Royal College of Physicians, Edinburgh, and can be obtained in ½-oz. and ¼-oz. collapsible tubes in 50 per cent., 25 per cent., and 10 per cent. dilutions.[1]

DIETETIC, HYGIENIC, AND THERAPEUTIC SPECIALITIES.

ALOCOL is a preparation of colloidal hydroxide of aluminium.[2] It has won much favour in relieving gastric hyperacidity, pyrosis, flatulence, and in other disorders associated with certain gastro-intestinal disturbances. This amorphous hydrate of alumina in colloidal form is available in tablets, and promises to be a valuable means of relieving acid dyspepsia and allied derangements so commonly met with in consumptives and other tuberculous subjects.

CREO-TERPIN COMPOUND is a preparation containing terpin-hydrate, creasote, and glycero-phosphate of calcium and sodium, which has been approved in America as an expectorant, and particularly as a serviceable medicament in cases of pulmonary tuberculosis.[3] Creasote has long been recognized as one of the most helpful of many drugs which have been used in tuberculosis, and in the form of Elixir Creasoli et Terpini Co. (Walpole) it is undoubtedly very useful.

GUAIACOL IODIDE, introduced by Mr. W. Martindale, promises to be a helpful preparation in dealing with tuberculosis.[4] It contains 10 per cent. of iodine. The dose suggested for a consumptive is from 5 to 15 grains. Certainly this agent seems to merit a carefully conducted trial.

GENCYDO is a new "remedy" for hay fever.[5] It is said to be prepared from the active constituents of fresh plant extracts, rich in calcium salts and organic acids, and is supplied in liquid form, as ointment, and in ampoules.

[1] Full particulars regarding the employment of tuberculin ointment can be obtained from Duncan, Flockhart and Co., Edinburgh, or from their London centre at 155, Farringdon Road, E.C. 1.

[2] Alocol is supplied in 7½-grain tablets and in the form of powder by A. Wander, Ltd., 45, Cowcross Street, E.C. 1, price per box of sixty tablets, 3s. 6d.; in powder, 100 grms., 3s. 9d.; 250 grms., 7s. 6d.

[3] Creo-Terpin Compound is prepared by Henry K. Wampole and Co., Ltd., Perth, Ontario, Canada. Particulars can be obtained from the English agents, F. Newbery and Sons, Ltd., 27, Charterhouse Square, E.C. 1.

[4] Guaiacol Iodide is supplied by W. Martindale, 10, New Cavendish Street, W. 1., price 5s.

[5] Gencydo is prepared by the International Laboratories Co., Ltd., Arlesheim, Switzerland, and particulars may be obtained from the British agents, the Anglo-French Drug Co., Ltd., 238A, Gray's Inn Road, W.C. 1.

EVATMINE is another new preparation which is being advocated as serviceable in the prevention and arrest of asthmatic attacks.[1] It is available in ampoule form, and is administered subcutaneously.

SAL-HEPATICA is a well-known and widely-approved effervescing saline combination, which has a laxative action and serves as a valuable eliminant in various disorders dependent on toxic agents, particularly those which are autogenous.[2] It is a serviceable agent in dealing with certain gastro-intestinal derangements, and some other disorders commonly met with in tuberculous subjects.

Many consumptive patients are the subjects of extensive oral, pharyngeal, and laryngeal sepsis, often with foul breath, which is a trouble to themselves as well as to others. Medical advisers having to deal with such cases will find the Gargarisma Formalin Co. and Effervescing Dental Tablets introduced by C. J. Hewlett and Son, Ltd., of much practical assistance.[3]

LAC BISMUTHI is a permanent aqueous suspension of bismuth hydroxide, which acts as an astringent and sedative to the gastro-intestinal mucosa. It can be employed alone, or in association with cerium, salol, salicylates, and other therapeutic agents. Lac Bismuthi has proved of much value in relieving deranged conditions of the intestinal tract, only too common in tuberculous subjects.[4]

THE "ANNULOID" MENTHOL COMPOUND consists of a special form of medicament for the preparation of solutions. They are compact rings manufactured by an improved process to prevent undue hardening on keeping, and are compressed on patent machines specially designed for the purpose. They offer the following advantages: (1) They do not harden on keeping; (2) they are not affected by a reasonable amount of exposure to moist atmosphere; (3) rapidity of solution; (4) dissolved in *warm* water, they quickly produce a pleasant and effective antiseptic solution for mouth-wash, nasal douche, spray, or gargle. By their use a desirable solution can be speedily prepared for the local treatment of coryza, pharyngitis, nasal catarrh, and allied conditions.[5]

NASAL CREAMS, introduced by Duncan, Flockhart and Co., provide medicaments in a portable, cleanly, convenient, and thoroughly hygienic form.[6] Each preparation is encapsuled in a gelatine case with elongated tapering nozzle. When required this is snipped off, and the cream is gently squeezed into the nasal passage. After use the capsule can be covered by a gelatine protector. There is a series of six forms—Alkaline, Antiseptic, Astringent, Iodized, Sedative, and Stimulant. These Nasal Creams will be found to be of much value in dealing with

[1] Medical advisers may obtain a specimen set of ampoules with particulars on application to the British Organotherapy Co., Ltd., 22, Golden Square, W. 1.

[2] Medical advisers may obtain a specimen and particulars of "Sal-Hepatica" on application to Stone-Ballantine, Ltd., 13, Well Court, Queen Street, E.C. 4.

[3] Messrs. C. J. Hewlett and Son, Ltd., 35-42, Charlotte Street, E.C., have published a little circular on "Oral and Laryngeal Sepsis," which gives full particulars regarding their excellent and most serviceable preparations for dealing with subjects of this condition.

[4] Lac Bismuthi is supplied by Symes and Co., Limited, 14, Hardman Street, Liverpool.

[5] Further particulars regarding "Annuloid" Menthol Compound and a clinical trial sample will be sent on application to Allen and Hanburys, Ltd., 37, Lombard Street, E.C. 3.

[6] The Nasal Creams are manufactured by Duncan, Flockhart and Co., 104-108, Holyrood Road, Edinburgh, and 155, Farringdon Road, E.C. 1, from whom full particulars can be obtained.

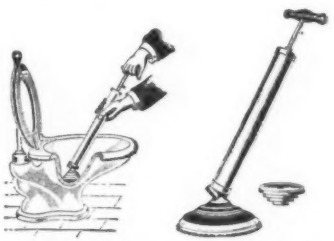
some of the catarrhal and other morbid states which are so commonly met with in tuberculous cases.

IPANA TOOTH-PASTE is a reliable dentifrice entirely free from grit, and composed of antiseptic, cleansing, and tooth-preserving agents.[1] It is pleasantly flavoured, and is put up in convenient collapsible metal tubes.

VEROX is a preparation of fluid beef, highly nutritious, palatable, and serving as an excellent stimulant for delicate subjects and tuberculous patients.[2] It is rich in assimilable phosphorus and nitrogen, and contains gland-stimulating vitamins. We believe that the Verox nutrient preparations should be of much service in hospitals and sanatoria, and they will undoubtedly be of considerable assistance to nurses and others called to care for tuberculous subjects in their own homes.

SANITARY AND SERVICEABLE APPLIANCES FOR HOSPITALS, SANATORIA, PATIENTS, AND DOCTORS.

THE HERCULES LIFT AND FORCE PUMP, invented by Mr. Hector Macfarlane, will be appreciated in hospitals, sanatoria, and other institutions, as well as for service in private houses.[3] As indicated in the accompanying figures, it provides a means where obstructions in sanitary traps and drain-pipes can be easily, rapidly, and effectively dealt with. It is already in use in a large number of hospitals, hotels, clubs, and other buildings. The appliance is a hydraulic pump, and can be used either as a lift or a force pump. The pump is of brass, and is provided with a series of rubber cups, built up on an embedded steel plate, which allows of connection with any shape or size of closet, sink, or lavatory basin. This simple, inexpensive, durable, and very practical appliance is one which is time, labour, and money saving, and it only needs to be known and used for its merits to be appreciated.



HECTOR MACFARLANE'S PATENT HERCULES LIFT AND FORCE PUMP.

THE HILLIARD NEW ABSORBENT BAG will be greatly appreciated by those who are the subjects of slight urinary incontinence.[4] This condition, often associated with frequent micturition in the elderly, or occurring among nervous subjects, is not infrequently a source of great anxiety and distress to consumptive and other patients troubled by

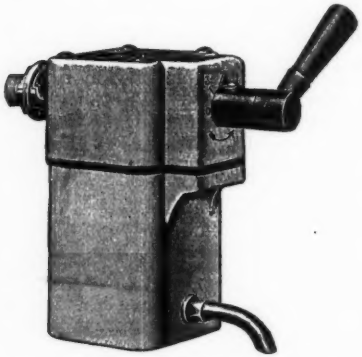
[1] Ipana is supplied by Bristol-Myers Co., 60, Cheapside, E.C. 4, who will be glad to send free sample on application.

[2] Verox Fluid Beef and the other Verox preparations are provided by the Tooth's Extract of Meat Co., 23, Leman Street, E. 1.

[3] The Hercules Lift and Force Pump is supplied direct by the inventor and maker, Hector Macfarlane, Southampton House, 317, High Holborn, W.C. 1, price 25s. complete.

[4] The Hilliard Rubber Absorbent Bag for Frequent Micturition is supplied by W. B. Hilliard and Sons, 123, Douglas Street, Glasgow, price 30s. each; spare rubber bags, 21s. each.

chronic or paroxysmal cough. This simple invention consists of a reliable rubber receptacle fitted with absorbent sponge. It can easily be adjusted, and when worn is not noticeable. It is not intended to receive the full bladder contents, but to catch all involuntary overflow. The receptacle can be emptied without removal at any convenient place, does not prevent normal voluntary relief when occasion offers, and can readily be cleansed. The appliance can be used for male or female.



THE HYDROTHERM.

THE HYDROTHERM is an electric water heater which seems likely to prove of much service in hospitals and sanatoria.[1] It is said to provide an inexpensive and reliable means for an instantaneous supply of hot water at any time of the day or night.

SHEEPSKIN MOCCASINS are much used in America for sanatoria patients, and especially for children in open-air schools.[2] There are many tuberculous subjects in this country who, when undergoing open-air treatment, especially in wintry weather, would appreciate the comfort which comes from the use of this sensible form of foot-gear.

SHEEPSKIN MOCCASINS.

The Self-Controlled Air Cushion Company, Ltd., have introduced some novel forms of air mattresses and cushions, which should prove of great value to consumptive patients and the subjects of various forms of surgical tuberculosis.[3] These comfortable and serviceable contrivances offer many advantages over the old-fashioned water-bed, stuffed mattress, and air and water rings. Lovers of ease in bed, motor side-car, or elsewhere will appreciate these praiseworthy specialities. The air within the mattress or cushion is controlled by rubber tubes kept in position automatically. Each is made from the purest rubber, will

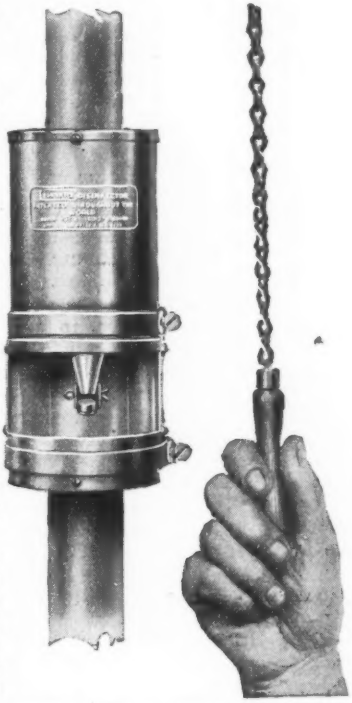
[1] Hydrotherm is made by Hydrotherm, Ltd., Medical Department, Kingsway House, Kingsway, W.C. 2.

[2] Sheepskin Moccasins are made by George L. Starks and Co., 16, Broadway, Saranac Lake, New York, U.S.A., price, height 10 in., $3.00; height 6 in., $1.35, post paid.

[3] Particulars and illustrations of the various forms of the Morley Air Mattress and other air specialities can be obtained on application to the Self-Controlled Air Cushion Co., Ltd., Clifton Street, Newton Heath, Manchester, or 408, Sentinel House, Southampton Row, W.C. 1.

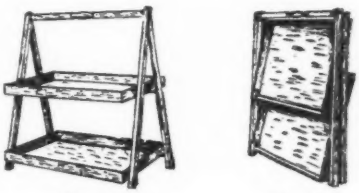
remain inflated indefinitely, can be readily cleansed, and is generally hygienic.

THE LEWBART AUTOMATIC DISINFECTOR is a valuable adjunct to all water-closets, and especially lavatories used in connection with hospitals, sanatoria, schools, and other public institutions, although of course it is equally applicable to the sanitary arrangements of the private house.[1] The Disinfector is fixed on the down-pipe leading from the cistern to the pan of the pedestal The container or refill contains sufficient Jeyes' Fluid to meet the needs of about 1,400 pulls of the lavatory chain. The disinfectant provided does not produce any discoloration. The chief points in the construction of the Disinfector are indicated in the accompanying illustration.



THE LEWBART AUTOMATIC DISINFECTOR.

THE STANLEY TWIN FOLDING TRAY is a novelty which will at once be appreciated by patients and those who have to wait on them.[2] It is a compact, serviceable, folding, double-tier carrier which for use both indoors and outdoors is time and labour saving. The chief features of this double tray is indicated in the figure annexed. The stand is constructed of stained hard wood, and it can rapidly and easily be placed in position or folded up, an arrangement which will at once be appreciated by those who have to serve in a small ward or room. This stand will be invaluable for patients undergoing open-air treatment, and nurses and teachers who have to deal



Open. Closed.

THE STANLEY TWIN FOLDING TRAY.

[1] The Lewbart Automatic Disinfector is made of metal heavily nickel-plated, and complete with container holding 16 ozs. Jeyes' Fluid, two plated clips, and rubber joints costs 35s. Full particulars can be obtained on application to the Lewbart Manufacturing Co., Ltd., 23, Norfolk Street, Strand, W.C.

[2] The Stanley Twin Folding Tray is supplied by the Stanley Woodworks, Harold Road, South Lowestoft, price 15s. 6d. each.

with children in residential sanatoria and in connection with open-air schools will find this effective tray exceptionally serviceable.

The inventors known as Holworthy Patents, Ltd., have introduced a number of cleverly-designed and serviceable novelties which deserve to be found in all homes and schools, and will certainly be useful in many hospitals and sanatoria.[1] THE PATENT CHAIR REPAIRING DEVICE provides means whereby sagging chairs can be effectively repaired. A set of eight brackets, wedges, and necessary screws only costs 2s.

THE "ADEE" CLEANER AND POLISHER is a simple, inexpensive, time and labour saving device for the cleansing of difficult windows and highly-placed fanlights. It can also be employed as a strength economizing agent in floor polishing.

THE HOLWORTHY WOOL AND SILK WINDER will be appreciated by many a delicate worker and tuberculous patient. It will be a boon to all knitters, for it provides a means whereby any sized skein of wool or silk can be dealt with. It is always ready for use, and is never likely to get out of order. The value of these ingenious devices will be evident to all delicate or tuberculous subjects.

CLAROCIT is a novelty which laryngologists, ophthalmologists, wearers of glasses, drivers of motor-cars, and all others who in any way use glass which may be dimmed by exposure to rain and moisture will welcome.[2] It is a preparation not unlike a black miniature soap-stick, which when rubbed over spectacles, goggles, motor-screens, or mirrors, which are then polished, keeps lenses and glass surfaces clear for a long time.

A particularly excellent form of MEDICATED TOILET PAPER is being manufactured at the Drayton Paper Works. It provides a soft, smooth, strong, non-irritating surface, and is medicated with "Verpine" disinfecting fluid, which has been shown by actual tests to possess germicidal properties. This sanitary necessity may be thoroughly recommended for use in hospitals and sanatoria, as well as for schools and other public institutions, and domiciliary purposes.[3]

Patients in sanatoria and elsewhere, as well as men travelling for health or pleasure, will appreciate the new double cap form of the justly popular Williams's Shaving Stick. It allows for use of the soap at either end, is convenient to hold, can readily be reloaded, and the quality of the soap leaves nothing to be desired.[4] They will find the Williams's way of shaving easy, economic, and effective.

Microscopic Stains are now being supplied by the British Dyestuffs Corporation, Ltd.[5]

[1] Full particulars regarding the various Holworthy Patent Devices can be obtained on application to Holworthy Patents, Ltd., 6, Iddesleigh House, Caxton Street, S.W. 1.

[2] Pencils or tablets of "Clarocit" can be obtained from Mr. A. Roberts, 63, Dalston Lane, Dalston, E. 8, price 2s. 6d. and 5s.

[3] Particulars and prices regarding the Medicated Manilla Toilet Paper can be obtained on application to the Drayton Paper Works, Ltd., South Park, Fulham, S.W. 6.

[4] Doctors and patients desiring a trial size will receive a specimen on sending name and address, and two penny stamps to cover postage, to the J. B. Williams Co., 71, Southampton Row, W.C. 1.

[5] "Some Notes on Microscopic Stains" is an interesting and informing brochure supplied by the British Dyestuffs Corporation, Ltd., 70, Spring Gardens, Manchester. A copy will be sent to any medical adviser on application.

THE OUTLOOK.

THE STRUGGLE WITH TUBERCULOSIS.

Sir James Kingston Fowler, in his new work on "Problems in Tuberculosis," quotes the following from a letter he has recently received: "It would seem as though the tuberculosis movement at the present time has ceased to move. Leaders do not appear to lead. Many workers are discouraged, and have withdrawn from service. But little scientific investigation is being carried on. State action has almost eliminated voluntary efforts. There is no enthusiasm among tuberculosis officers. Tuberculosis schemes have but little life in them. Conductors of sanatoria are disappointed with results. Patients are disheartened, and everywhere there seems to be depression. The tuberculosis movement lacks soul, and is deficient in aims, organization, and financial means. Meanwhile tuberculosis is causing immense wastage of life and exhausting national resources." No doubt these words attempt to express what is in the minds of many. Disappointment at the meagreness of the results attained and discontent with the methods and measures now in vogue are undoubtedly exercising a prejudicial influence on the conduct of the tuberculosis campaign. In the May number of the *Hospital and Health Review* there appeared an article on "Tinkering with Tuberculosis," from which we venture to reproduce the following: "Is it not time that the whole question of the public provision of treatment of tuberculosis were fully and frankly faced by the appointment of a Royal Commission with a very wide reference? Have the various forms of treatment justified themselves by results? Have the sanatoria effected cures of patients or even restoration of working capacity to a sufficient degree to permit of their continuance as a form of public curative treatment? Or is the contention fairly made in some quarters that the mortality among sanatorium patients does not show any improvement on that of cases treated in pre-sanatorium days? How far is their cost justified from the point of view of the educational value to the patient, and can this not be equally well effected at much less cost? Is the object of the isolation of advanced cases—admittedly a public health measure—defeated by the too late admission of patients or their refusal to stay in an institution, or both? Is the main function of the dispensary—that of a centre for advice and consultation—being departed from so that general practitioners are relieved of responsibility for the treatment of their patients? Are the experiments of village settlements or training centres proving their value; or is it a fact that tuberculous patients are loth to separate themselves from their fellows and settle in colonies, however much it may be demonstrated that that way health and life lie? Is it not possible to give men suitable sheltered employment at centres while living under hygienic conditions in their own homes?" These questions certainly demand the fullest possible answers. We have repeatedly urged the desirability of the appointment of a Royal Commission to investigate the present position of the tuberculosis problem in all its bearings. In view of the discoveries of Professor Dreyer, of Oxford,

it is more than ever necessary that such a comprehensive enquiry should be initiated without further delay. Professor Dreyer's new "antigen" or vaccine, according to a pronouncement just issued by the Medical Research Council, 15, York Buildings, Adelphi, W.C. 2, has given results in cases of tuberculous disease of the glands and of the skin which have "surpassed any known to have been attained regularly by other methods." The Medical Research Council are now arranging, in consultation with Professor Dreyer, for extensive trials of the new treatment by physicians and surgeons at various centres in different parts of the country where suitable facilities can be provided. Much has still to be learned regarding the best modes of application of the treatment, and it is not ready yet for general use. For the series of trials now in view supplies of the new vaccine will be prepared for distribution at the Oxford School of Pathology, from which for some years standard diagnostic sera for typhoid, paratyphoid, and dysenteric infections have been distributed after preparation on behalf of the Medical Research Council. As soon as the progress of the patients under treatment has been sufficiently watched and recorded, full publication will be made of the clinical results which have been obtained. If these justify the hopes which have been formed and lead to a wide use of the new treatment, it is believed that, by arrangements which have already been made by the Medical Research Council, adequately large supplies of the necessary "antigen" will be ready at very small cost.

NOTES AND RECORDS.

Dr. Rollier and his assistants are giving a fifth course of instruction on the Principles and Practice of Heliotherapy, at Leysin, August 13 to 18. In view of the recent publication of Dr. Rollier's great work on Heliotherapy, which is reviewed in the present issue of this journal, and the increasing interest which is being taken in sun treatment and Heliohygiene generally in Great Britain and our overseas Dominions, as well as in other lands, no doubt a large number of medical advisers will be glad to avail themselves of coming under the influence of Rollier's magnetic personality, and seeing for themselves the wonderful results which are being attained by the scientific application of Heliotherapy. Public Health Authorities should certainly arrange for their Medical Officers of Health, Tuberculosis Officers, and Medical Superintendents of Sanatoria to participate in the forthcoming course. The following is an outline of the programme:

MONDAY, AUGUST 13.

8.30 a.m.	Assembly at the Clinic Les Frênes.
9.0 ,,	Dr. ROLLIER: "An Introduction to Heliotherapy and Posology of Sun Cure."
10.30 ,,	Dr. ROSSELET: "The Physics of Meteorology of Light Treatment."
2.15 p.m.	Dr. ROLLIER: "The Practice of Heliotherapy: Tuberculosis of the Spine."
3.15 ,,	Dr. LICHTENBAUM: "The Diagnosis of Tuberculosis."
4.15 ,,	Dr. ROSSELET: "Biological Action of Light."
8.30 ,,	Concert at the Clinic Miremont.

TUESDAY, AUGUST 14.

8.0 a.m.	Dr. ROLLIER: "The Practice of Sun Cure: Tuberculosis of the Joints and the Clinical Results."
9.30 ,,	Dr. SCHMID: "Radiological Diagnosis of Tuberculosis of Bones and Joints."

10.30 a.m. Visit to Clinics and examination of cases.
2.15 p.m. Dr. AMSTAD: "Heliotherapy for Non-Tuberculous Affections."
3.15 ,, Dr. LEUBA: "Heliotherapy and the Skin."
4.15 ,, Visit to the Clinic Les Chamois.
8.30 ,, Concert at the Clinic Les Frênes.

WEDNESDAY, AUGUST 15.

8.0 a.m. Dr. ROLLIER: "The Practice of Sun Cure: Clinical Results in Peritonitis, Adenitis, and Uro-Genital Tuberculosis."
9.30 ,, Dr. SCHMID: "Radiographic Control of the Clinical Results of Heliotherapy."
10.30 a.m. to 12 noon. Visits to Clinics and examination of patients.
3.0 p.m. Dr. AMSTAD: "The Construction and Use of Orthopædic Apparatus used in Heliotherapy."
8.30 ,, At Home at the Clinic Miremont.

THURSDAY, AUGUST 16.

8.0 a.m. Dr. ROLLIER: "Cure by Work, and the Future of Surgical Tuberculous Patients and Heliotherapy as a Preventive Measure."
9.30 ,, Dr. SCHMID: "Radiographic Control of the Clinical Results of Heliotherapy."
10 30 ,, Visits to Clinics and examination of patients.
2.15 p.m. Visit to Sun School at Les Noisetiers, Sepey.
7.0 ,, Dinner at the Clinic Les Frênes, with exhibition of cinema films illustrating life and work of the children at the Sun School; and also tuberculous men consolidating the cure by work.

FRIDAY, AUGUST 17.

8.0 a.m. Dr. AMSTAD: "Adjuvants to Heliotherapy."
9.0 ,, Dr. MIEVILLE: "Heliotherapy and the Functions of Joints."
10.0 ,, Visits to Clinics and examination of patients.
Afternoon. Visits to other Sanatoria dealing with cases of pulmonary tuberculosis at Leysin-Feydey.

SATURDAY, AUGUST 18.

Excursions to Le Lac d'Aï and to Diablerets.

As far as is possible all the lectures will be illustrated by lantern slides, X-ray photographs, and actual cases. There is no fee for the Course, and visitors are entertained at the various Clinics at the merely nominal charge of ten francs a day. Leysin is easily reached, and all information regarding travel can be obtained on application to Sir Henry Lunn, M.D., 5, Endsleigh Gardens, London, N.W. 1; Messrs. Thomas Cook and Sons; and the British Offices of the Swiss Federal Railway, Carlton House, 11B, Lower Regent Street, London, S.W. 1.

Sir Henry Lunn, M.D., of 5, Endsleigh Gardens, N.W. 1, is making special arrangements which will be of great advantage to medical advisers attending Dr. Rollier's special Course at Leysin, August 13 to 18. Medical practitioners availing themselves of Sir Henry Lunn's arrangements will be able to visit Montana either before or after the Course at Leysin. The tickets will be available at specially reduced prices obtained for society travel, and will include seven days' free hotel accommodation at Montana. The ticket will be a direct return to Montana; the railway route passes through Aigle, from which the mountain railway ascends to Leysin. The fare from Aigle to Leysin and back is 7.35 francs, but medical practitioners attending Dr. Rollier's special course will be granted tickets at half the usual tariff on presentation of a legitimation. The cost of the return

ticket to Montana will be £10 18s. 6d. first class, and £7 9s. 5d. second class, but the price may be reduced if, as Sir Henry Lunn hopes, the Montana Sierre Railway will give free passes to medical practitioners. Sir Henry Lunn offers a week's accommodation at Montana because it is not permissible to use these tickets without a week's hotel accommodation, and it is anticipated that a number of medical practitioners will be glad to combine their visit to Leysin with a stay at Montana.

At the Ninth Annual Conference of the National Association for the Prevention of Tuberculosis, which will be held at the University, Edmund Street, Birmingham, July 12 to 14, there will be discussions on: The Care of Advanced Cases of Tuberculosis, especially as regards Prevention of Infection; Tuberculosis derived from Infected Milk; Tuberculosis Care Committees; Relative Prevalence of Tuberculosis among Workers in Different Trades, and Methods which are likely to reduce the Incidence in Special Trades; Proposed Amendments of Procedure in Notification of Tuberculosis.[1] A public address will be delivered by Professor Sir Robert Philip, M.D., LL.D., on "The Actual Position of the Tuberculosis Problem To-day."

In professional publications, as well as in newspapers, many references have recently appeared regarding the so-called Spahlinger treatment for tuberculosis.[2] A recent reply to a question in the House of Commons elicited the statement that "the Minister of Health is informed that no supplies of M. Spahlinger's remedies are yet available in this country. When they become available it will be open to the medical officers responsible for the treatment of ex-service men to utilize these remedies in the treatment of their patients if they consider it desirable."

Under the title of *Medicine* there has recently appeared a new quarterly which aims at providing an authoritative analytical review of general medicine, neurology, and pediatrics. This new periodical has made a most promising start, and we wish it much success.[3]

We are glad to welcome *Open Air*, which claims to be "*The* Magazine for Lovers of Nature and Outdoor Life."[4] It is a charmingly illustrated monthly, with interesting and instructive articles, which will appeal to all who seek health and happiness in the delights of an open-air life.

The Ministry of Health have issued a revised list of sanatoria and other residential institutions for tuberculous cases.[5]

[1] A copy of the programme may be obtained on application to the Secretary, National Association for the Prevention of Tuberculosis, 20, Hanover Square, W. 1 (Telegrams: Mayfair, 2,511).

[2] See correspondence, "L'Affaire Spahlinger," in recent issues of the *Lancet*.

[3] *Medicine* is edited by Professor David L. Edsall, of Harvard, and Professor John Howland, of Johns Hopkins, with Dr. Paul D. White, of the Massachusetts General Hospital as Associate Editor, and is published quarterly by Williams and Wilkins Company, Baltimore, U.S.A. Subscription per volume, $5.50 cents.

[4] *Open Air* is published at the offices of *Country Life*, Ltd., 20, Tavistock Street, Covent Garden, W.C. 2. Price, 1s. each monthly issue; annual subscription, 15s., post free.

[5] "List of Sanatoria and Other Residential Institutions approved by the Minister of Health for the Treatment of Persons suffering from Tuberculosis, and Resident in England and Wales, with the Names of the Administrative Counties and County Boroughs in which the Institutions are situate, and the Date on which the Approval expires in Each Case." Pp. 18. London: His Majesty's Stationery Office, Imperial House, Kingsway, W.C. 2. 1923. Price 3d. net.